

AUGUST 1956

Skyways

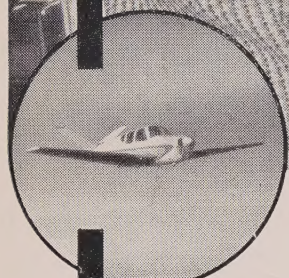
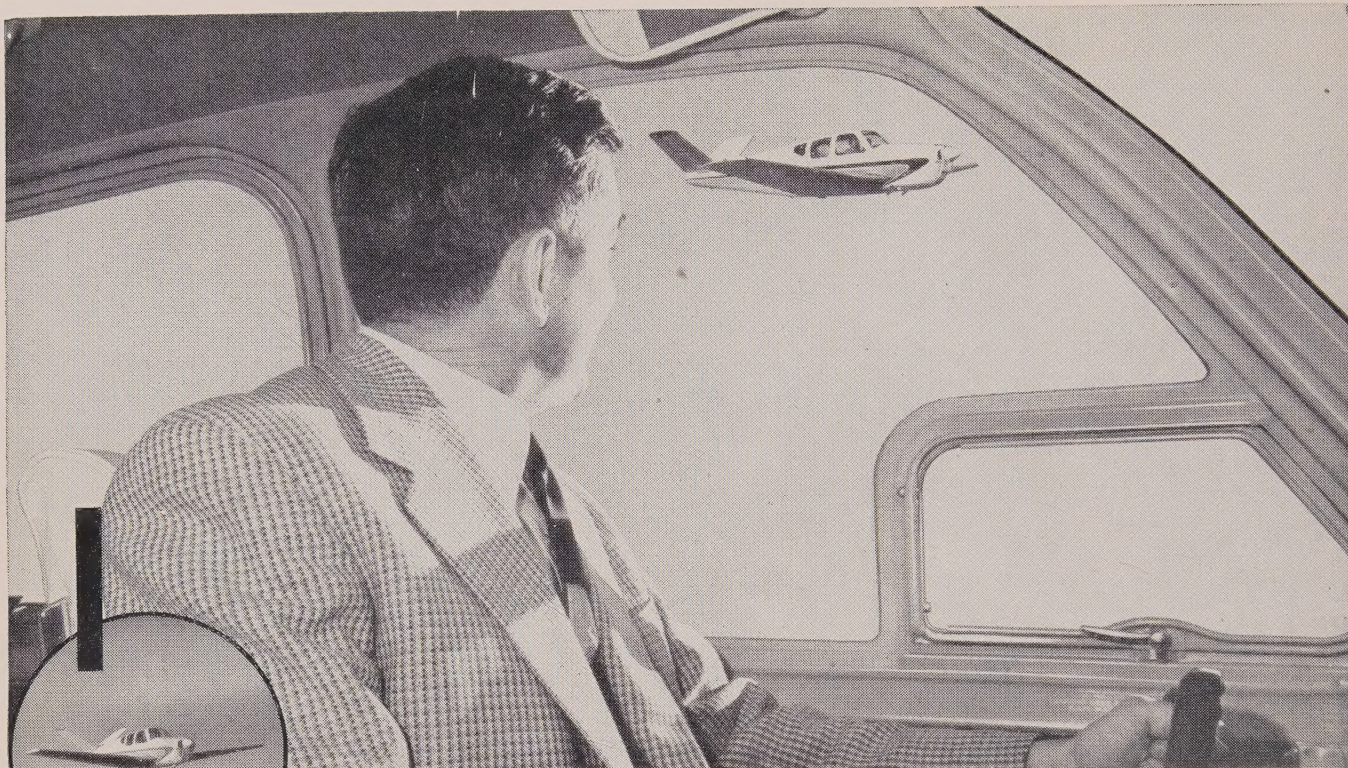
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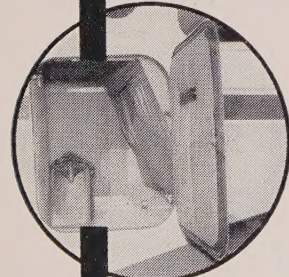
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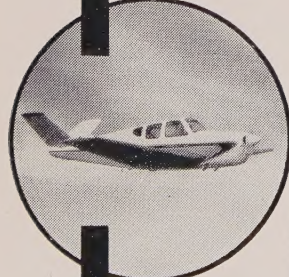
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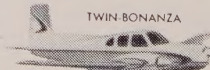
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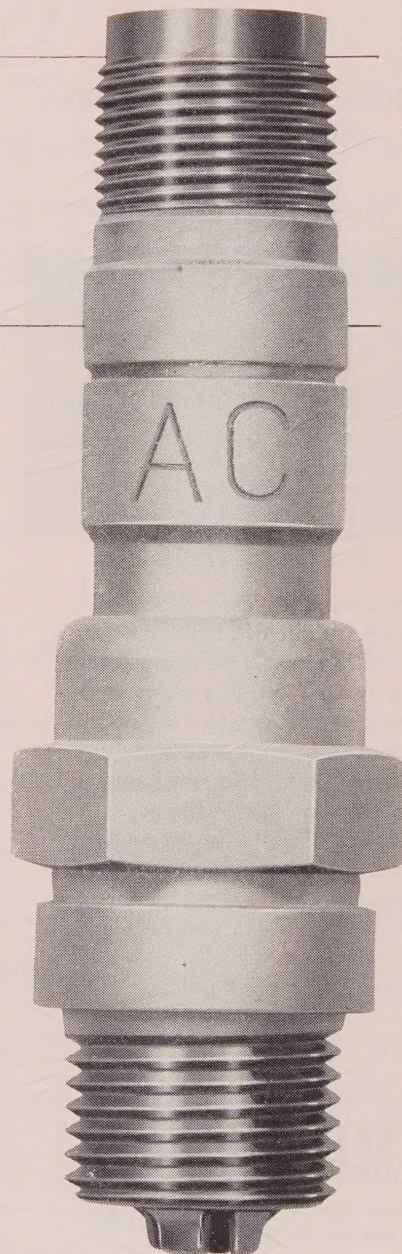
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Skyways

The Pioneer Publication of Business Flying

AUGUST, 1956

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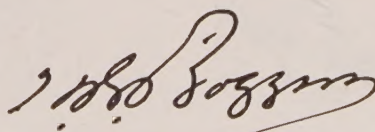
It is with pleasure that the Board of Directors of National Business Aircraft Association announces that SKYWAYS and NBAA have entered into an agreement whereby, beginning with the August issue, SKYWAYS becomes the official publication of NBAA.

This arrangement has been made to meet the expanding communications needs of NBAA, as an added means of increasing membership services, and as a contribution to the rapidly growing field of Business Flying.

As rapidly as possible, it is planned to expand the pages of SKYWAYS to include such standard features as Safety Exchange, Maintenance, Operations, Administration, and other subjects directed to specific Business Aircraft problems.

As with all publications, SKYWAYS can best serve its readers in direct proportion to its knowledge and understanding of their problems and needs. SKYWAYS and NBAA therefore sincerely solicit your comments and your suggestions, as well as your best wishes.

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PERSONNEL

Roger C. Fleming, Public Relations Director at Allison Div. of General Motors, has been elected Chairman of the Public Relations Advisory Committee of the Aircraft Industries Association for the year 1956-57. Fleming, who succeeds **John Canaday**, Public Relations for Lockheed at Burbank, is also Eastern Region Chairman of PRAC.

Earl S. Warner was announced by the CAB as Associate Chief, Office of Carrier Accounts and Statistics.

W. H. Carlson, **Stuart N. Smith**, and **George R. Hecht** were named as Vice Presidents of the Twin Coach Co. Mr. Smith and Mr. Hecht were previously executives of Twin Coach Aircraft Div.; Mr. Carlson was TC's regional manager in Washington.

Edward F. Harbison has been appointed Dayton-area Representative for Weber Aircraft Corp.

Kenneth E. Fersch and **William H. Kean, Jr.**, have been appointed Senior Sales Engineers for the Propeller Div. of the Curtiss-Wright Corp., Caldwell, N.J.

Robert J. Geis has been named manager of the newly formed North Central sales region of Beech Aircraft Corp. **Robert G. Oestreicher** is the new Northeastern Sales Manager.

E. D. Wilgus has been announced as Vice President and General Manager of Aviation Developments, Inc., Burbank, Cal.

Harry H. Wetzel, Jr., has been appointed Assistant to the President of Garrett Corp., Los Angeles.

Edmund G. S. Flannigan has been appointed Sales Representative of Atlantic Aviation Service, Inc., Philadelphia area.

Reuben P. Snodgrass has been named as Director of Flight Research for Sperry Gyroscope Co.

Ted C. Fisher has been appointed Administrative Engineer, and **Herbert N. Reitz** Senior Project Engineer, of the Hamilton-Standard Div. of United Aircraft.

Charles A. Sereno was elected Executive Vice President of Air Associates, Inc.

G. Joseph Minetti has been sworn in as a member of the Civil Aeronautics Board.

Frank L. Jorstad has been named Sales Engineer of the midwest territory by the Van Der Horst Corp., Olean, N. Y.

Edward L. McCabe has been appointed Assistant Sales Manager of the Philadelphia branch of The Electric Storage Battery Co.

E. A. Nave has been appointed Sales Manager for fabricated products of the Metals Div., Olin Mathieson Chemical Corp., N.Y.

James O. Burke has been announced as President of Standard Coil Products Co., succeeding **Glen E. Swanson**, who becomes Chairman of the Board of Directors.

Ray J. Schwab has been appointed Sales Manager of the Delron Co., South Gate, Cal.

Richard Hodgson, Executive Vice President and **Joseph B. Wharton, Jr.**,

have been elected to the Board of Directors of Fairchild Camera and Instrument Corp.

A. Bruce Boehm, Director of National Pilots Association, has been elected to the newly created post of Executive Vice President of Enjay Co., Inc.

Dr. John L. Miller has been named Director of Defense Activities for the Firestone Tire and Rubber Co.

Ernest E. Sanford has been named Administrative Manager of Vitro Engineering Div., N.Y., a branch of Vitro Corp. of America.

William F. Kaiser and **William R. Lilley** have joined the Information Services Dept. of the Martin Co., Baltimore.

Marvin D. Weiss has joined Fischer and Porter Co., Hatboro, Pa., as Manager of the Analytical Div. of the Research Dept. **Vincent Matner** has joined Fischer & Porter as Chief Product Engineer.

E. J. Norman has been appointed Sales Manager of Hycon Electronics, Pasadena, Cal.

Robert C. Schmid has been announced as District Sales Manager in Los Angeles for General Electric's Light Military Electronics Equipment Dept.

Frank J. Eberle is resuming duties for Air Express International as regional vice president in charge of Miami, New Orleans and Houston.

Charles Billerman has been appointed District Sales Manager for Louisville district by TWA.

Dr. Herbert Bandes has been appointed to the newly created post of Chief Engineer-Semiconductors of the Electronics Div. of Sylvania Electric Products, Inc.

Edward L. Shea has been announced as Chairman of the Board of the Ethyl Corp., N.Y., and **B. Bynum Turner** as President.

Fred S. Hage, Jr., was named Director of Public Relations of Solar Aircraft Co., on the retirement of **Vice Adm. W. D. Baker**.

Dr. Harner Selvidge has been appointed Staff Engineer for the western divisions of Bendix Aviation Corp.

John B. Seastone has been named Director of the Technical Div. of Olin Mathieson Chemical Corp., N.Y.

Harry R. Wege has been appointed Manager of RCA Missile and Surface Radar Dept.

HONORS

Fred Hyatt, Chief Weights Engineer at Republic Aviation Corp., has been chosen by the National Society of Aeronautical Weight Engineers as recipient of one of the three fellowships granted annually in the U.S.

COMPANIES

Pacific Airmotive Corp. has issued a Second Quarter Report to Stockholders which indicates a million dollar increase in consolidated sales for PAC and subsidiary Pacair, Inc., for period ending May 31, 1956, over the comparable period in 1955.

During the first eight months of **Beech Aircraft's** 1956 fiscal year, sales of com-
(Continued on page 37)

A CHALLENGING THOUGHT

Can you imagine street and highway traffic rules which would permit members of the medical profession to drive on the left side of the road and run their automobiles through red traffic signals, at the same time requiring the members of the legal profession to drive on the right side of the road and stop for red lights? Under such a situation you really would never see death take a holiday.

Uniformity of necessary rules and regulations for *highways and airways* must exist for *all* users of both.

Can you imagine what would happen to air safety, especially under IFR conditions, if the military were to operate under one set of air traffic rules while civilians operated under a different set of rules? Sounds like a foolish and absurd question, doesn't it? But it isn't. Listen to what the Department of the U.S. Air Force proposed under date of April 25, 1955. Commenting on Senate Bill 1119, 84th Congress, designed to amend the Civil Aeronautics Act of 1938, the Air Force said:

" The terms 'Air Navigation' and 'Air Navigation Facilities' should be limited wherever they appear so as to make it clear that the Act does not intend to give a civil agency the statutory authority to interfere in purely military aviation matters."

Certainly the Air Force does not mean to imply that there is now intended or has ever existed, any statutory provision that gives civilians control over military air bases. No, the Air Force speaks of "Air Navigation" and "Air Navigation Facilities"; the facilities on federal airways and on civilian airports at your home town and mine.

Does the Air Force propose to install incompatible, experimental Tacan on our federal airways with money from a military budget despite Congressional designation of VOR/DME for a common system?

Do you suppose the next request will be to make military automobiles immune to civilian street and highway regulations? Either situation would be utterly untenable—and wholly unnecessary in time of peace. To grant such a request could be tantamount to grounding 60,000 civilian airplanes.

America is a democracy guaranteeing equal privileges and equal obligations to all citizens. In 180 short years it has grown from a loose federation of states to the most powerful and the most prosperous nation this world has ever known. *Could it have done so under a military dictatorship? Could it have done so under a system of government where the military, in public places, was not subservient to civilian laws?*

America has grown great and strong by holding that political parties, branches of government,—Judicial, Legislative, Executive, or Departments thereof (including the Military)—must conduct themselves for the public good.

There can be no doubt but that the Congress of the United States will hold that air traffic rules and regulations must be observed by *all* users of the air space—civilian and military alike. It is up to citizens to tell their legislators they believe that Congress should so require.

To hold otherwise would not only constitute a strangle hold on civilian aviation—it *would*, moreover, be a declaration of a change in the concept, and by such usurpation, ultimately in the form of our Government. May God forbid!

Wisely, our laws have recognized no privileged classes and have thus insured justice, equality, freedom and tranquility for all of our people. In times of peace, air traffic rules and regulations along public airways and at public airports have always been, and should continue to be, civilian matters. Any necessary measures needed to insure adequate national defense can, should, and will be incorporated in those rules and regulations. When and if war should come, we will, as we always have, submit to necessary military regulations with the firm knowledge that when war ends, unnecessary military controls will also end. Such is our heritage: such is the very sinew and fiber and blood of our way of life. Any other policy fails to guarantee life, liberty, and the pursuit of happiness. Only under such a policy can commerce flourish and our economy expand.

Rules and regulations and the determination of who interprets and enforces them, as well as whether or not they apply uniformly to *all* users of the airspace, is a problem facing aviation.

How Business Aircraft Contribute To Expanding Canadian Industry

By James Montagnes

Over 200 executive aircraft are used in Canada to take businessmen and engineers to all parts of North and South America. Canada's rapidly expanding postwar economy has brought the executive plane into daily use to fly Canadian business executives to far northern mining developments as well as to major cities in the United States.

The list of owners of Canadian executive aircraft covers every phase of the Canadian economy, from department stores to construction companies. Canada's vast territory, extending almost 5,000 miles from Atlantic to Pacific coasts, and from the international boundary with the United States to the North Pole, is humming with natural resources developments and industrial expansion. Communities are widely scattered in this big area north of the United States' boundary, and Canada's 15,000,000 people are busy throughout their broad land.

It is because of the vast distances in Canada and the development of natural resources that the executive plane became a necessity for Canadian businessmen. That is why a number of construction companies and public utilities operate fleets of aircraft in Canada.

There is for example Canadian Comstock Co., Ltd., Toronto, which operates a four-engined DeHavilland Heron to take its executives to various construction jobs throughout Canada. This British-built Heron flies between 400 and 425 hours a year and is fitted to carry eight passengers anywhere throughout North America. (There are only three Heron aircraft registered in Canada, the other two being operated by the Department of Transport, Ottawa, and the De Havilland Aircraft Co. of Canada, Ltd., Toronto.)

Canadian Comstock's aviation department reports that it costs about \$21 an hour for gas and oil to operate

this four-engined Heron, that it uses about 50 American gallons of fuel per hour and about a gallon of oil an hour. Maintenance for the plane, which cruises at 185 miles per hour, includes complete engine overhaul every 1,000 hours, and intermediate overhaul every 450 hours. A fulltime flight engineer is on the company's staff to look after the plane.

Other construction companies operating aircraft include Mannix Ltd., Calgary; McNamara Construction Co. Ltd., Toronto; H. J. McFarland Construction Co. Ltd., Toronto; Trans-Canada Contracting Co. Ltd., Calgary; C. A. Pitts General Contractor Ltd., Toronto; and Marwell Construction Co. Ltd., Vancouver.

Oil companies and firms associated with the oil industry, such as oil drilling companies, operate quite a few executive planes in Canada. One of the largest fleets is owned by Imperial Oil Ltd., Toronto, which has a Convair, two DC-3's, several DeHavilland Beavers and Otters, a Lodestar, and a Grumman Mallard. This company operates an aviation department with maintenance staff at its Toronto headquarters. Its planes are in constant use, flying executives not only throughout Canada and the United States, but also flying engineers and geologists to all parts of northern Canada.

A rule of Canada's aviation department, incidentally, forbids liquor to be carried or served on its planes. This is a protection for the flight staff, as it would be difficult for a pilot to be firm on the subject with a company executive or director who had imbibed too freely.

Probably the largest users of executive planes in Canada are lumber and mining companies, the former to fly their top executives into otherwise difficult-to-reach forest areas, and the mining companies to fly financiers, geologists and company directors into the numerous remote new mining areas far north of Canada's railway lines or distant from scheduled airways. An example of such an operation is Hollinger Ungava Transport Ltd., which has a fleet of DC-3, Bellanca and Beechcraft airplanes, flying executives and staff for the iron ore mining development in Labrador.

A list of companies in the mining, lumber, pulp and paper mill industries using executive planes would include some of the biggest companies in these fields. Included are Algoma Steel Corp., Sault Ste. Marie; Consolidated Mining & Smelting Co. of Canada Ltd., Trail; Tretheway Logging Co. Ltd., Vancouver; McIntyre Porcupine Mines Ltd., Toronto; Sherritt Gordon Air Transport Ltd., Toronto; Canada Veneers Ltd., Vancouver; Gunnar Gold Mines Ltd., Toronto; Bowaters Newfoundland Pulp & Paper Co. Ltd., Corner Brook; and Spruce Falls Power & Paper Co. Ltd., Toronto; North Shore Paper Co. Ltd., Baie Comeau, Quebec.

There are many other companies in these various indus-



THIS Convair executive transport is one of a fleet maintained by Imperial Oil Company, pioneer in Canadian industrial flying.

tries using executive aircraft ranging from recently-bought DeHavilland Dove twin-engine planes to war surplus Anson twin-engine aircraft, and including a large number of postwar DeHavilland Beaver and Otter, Beachcraft Cessna, Taylorcraft, Noorduyn, Grumman, Lockheed, Stinson and Republic aircraft.

Other categories of companies which use airplanes in Canada include T. Eaton Co., Ltd., Toronto, operating department stores across Canada; Massey-Harris-Ferguson Ltd., Toronto, farm implement manufacturers; Hudson Bay Co., Winnipeg, operating fur posts and department stores across Canada; Canada Packers Ltd., Toronto, a nation-wide meat packing organization; Canadian Breweries Ltd., Toronto, with an eastern Canadian operation; Goodyear Tire & Rubber Co. Ltd., New Toronto, tire manufacturers; and Interprovincial Pipe Line Patrol Co. Ltd., Calgary, surveying and maintaining oil pipelines across Canada.

Users of executive planes include at least two daily newspapers, London Free Press and Toronto Globe & Mail, and one broadcasting station, CKOV, Kelowna, B.C. A number of religious organizations in western Canada use their own planes to fly about the country to various western cities. Aircraft manufacturers such as A. V. Roe Canada Ltd., Toronto, DeHavilland Aircraft of Canada Ltd., Toronto, and Canadair Ltd., Montreal, have planes for executive use, principally DC-3, Heron and Dove aircraft.

In addition to these and other companies using planes, all Canadian provincial governments and the Royal Canadian Mounted Police use aircraft to fly officials throughout Canada. The Canadian government uses executive aircraft for its leading officials and department ministers in addition to military aircraft available. For example, the Department of Transport, Ottawa, has a

number of airplanes including a Vickers Viscount turbo prop for use by its officials.

To assist business planes in obtaining better facilities and services at Canadian airports, the operators of executive aircraft have formed the Corporation Aircraft Owners Committee as a branch of the Air Industries and Transport Association of Canada. Chairman of this committee is Hal Keefe, chief of aircraft division of Mannix Ltd., Calgary. He recently stated that the operation of corporation-owned aircraft is growing so rapidly in Canada that "the carrying capacity of corporation-owned airplanes compares favorably with the carrying capacity of Canada's major airline, Trans-Canada Airlines."

Unfortunately there are as yet no figures available in Canada as to how much corporation-owned aircraft are used, what they consume in fuel, the wage bill for flying and maintenance staffs, and other statistics which would show the growth of this branch of aviation.

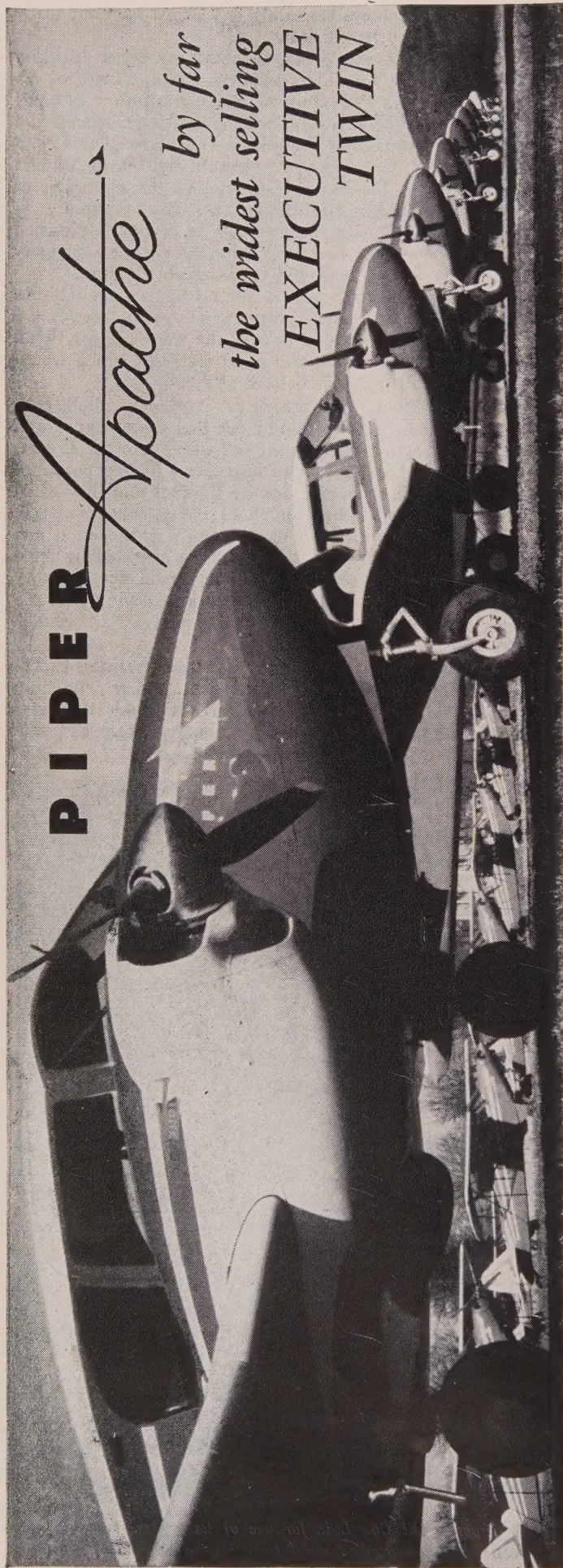
While no facts and figures are available, pilots of a number of corporations point out that maintenance and operational standards are on a par with any other aircraft operation in Canada. There have been few corporation-owned aircraft accidents, despite the fact that they often fly in areas which have none of the scheduled airway electronic equipment. All multi-engined corporation aircraft, and most single-engined aircraft operated by business executives, are fully radio-equipped for two-way operation, and all the larger planes are equipped with the same instruments found on airline aircraft of similar make.

The operation of aircraft for Canadian business executives is largely a postwar development, and is expanding rapidly. The size of Canada's territory and its sparse population make the airplane a necessary means of transportation for Canada's busy business men.



CANADIAN executive planes often fly into remote areas. This DeHavilland Beaver, one of a large industrial fleet maintained

by Imperial Oil Co., Ltd., for use of its engineers and executives, was photographed on a river in the Canadian northwest.



PIPER

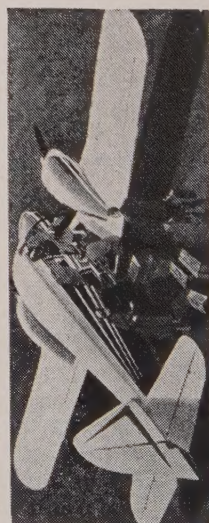
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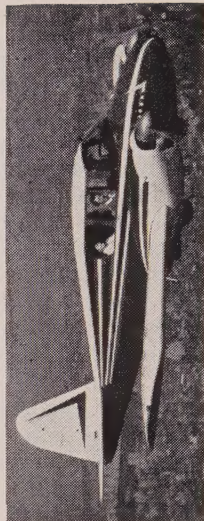
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PERFORMANCE 170 mph cruise at 75% power; 52 mph stalling speed lets you use any airport. Excellent single engine performance.



RELIABILITY Built to highest standards, proven in millions of miles of use; powered by two Lycoming 150's—the ultimate in reliability.



PIPER AIRCRAFT CORPORATION, LOCK HAVEN, PENNSYLVANIA

Minimum - Time Track Construction

By Robert K. Polson

Solution for a minimum-time track between two points originated with Francis Galton, a sailing master who applied its principles in 1872. Galton's method was improved by several individuals, and brought to its present state of development in 1953, through the efforts of H. M. DeJong, Dutch meteorologist, and Captain F. C. Bik of KLM. Since that time, numerous variations in technique have been advocated by the different international air carriers, Mats, and by two domestic airlines for use within the continental United States. The "Minimum-time track" (also termed least-time, minimal-time, minimum flight path, etc.), is the most rewarding of all the pressure-pattern techniques in areas where wind observations are plentiful, may be adapted to IFR conditions by flight over the most nearly-coincident civil airway, and is therefore best suited for use by the executive pilot.

Pressure-pattern flight derived its name from the pressure field which determines the wind, and from the fact that in certain oceanic dispatch procedures, the track is solved by working directly with pressure. In all cases, the ultimate motivating force is the wind, and recourse to pressure is not required. A vectorial solution is of particular interest to the business pilot, because he is already well-founded in the use of wind vectors. The following solution is identical in principle with the method developed by DeJong and Bik, with slight modifications in construction and explanation to better meet the requirements of the executive pilot. All that is required is an understanding of force vectors, a Weems plotter, colored pencil, and a suitable working-chart such as Weather Bureau map no. 1516. The Weather Bureau will furnish single copies in response to individual requests. An identically-scaled map, known as chart 10 U.S., is available commercially from LaRue Printing Company, 906 Baltimore Avenue, Kansas City 6, Missouri. Any map may be used, provided the force vec-

tors are synchronized to the scale of the map.

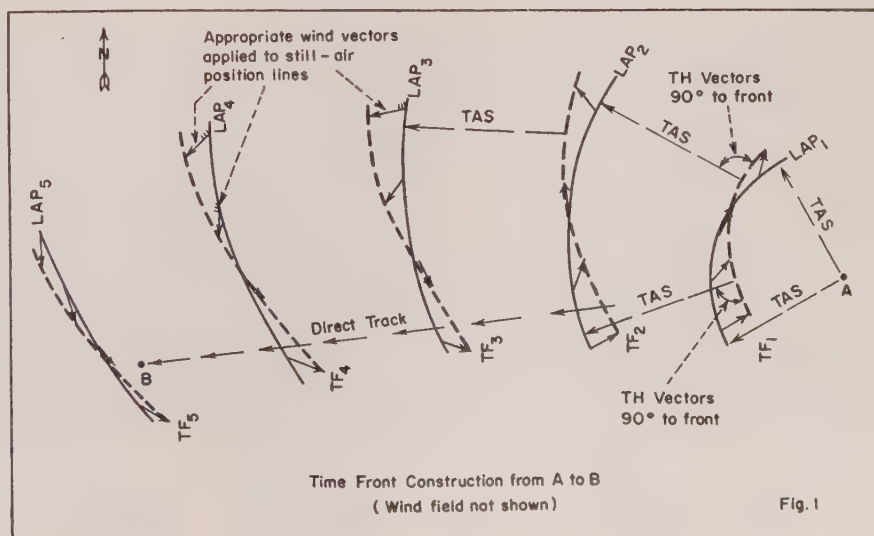
The first step is to establish a *wind field* over a rectangular area along the direct track, and laterally in the anticipated direction of the pressure track, for a distance equivalent to 50% of the flight distance involved. This is accomplished by plotting the 12-hour forecast winds for the desired altitude, at the corresponding station location. When the approximate path of the minimum-time track cannot be ascertained by millibar chart inspection, this wind field must be plotted on both sides of the direct track. It is recommended that the wind direction be correctly plotted, in degrees, with plotter or protractor. Wind force need not be drawn to scale, but should be indicated numerically, enabling elongated wind arrows for improved direction indication.

If an arc were swung by drawing compass from the point of departure, utilizing a distance equivalent to the true airspeed of the aircraft in knots, for the first hour of flight, such an arc would represent the various possible positions of the aircraft, in calm air, for corresponding directions of flight; is also a line joining the series of one-hour "air-plots," or may be termed a *locus of air position*.

(Labeled LAP_1 of figure 1.) This may also be done by plotting the true-air-distance from the departure point, in various directions with the Weems plotter, and "fairing" the resulting points into an arc, thus eliminating the need for a drawing compass. Twenty-five miles on the bottom scale of the plotter is equivalent to approximately 170 N.M. on chart 10 U.S. Plotters especially designed for work on this map may also be purchased.

Application of the appropriate wind vectors to equally-spaced points along this line will determine the forecast positions of the aircraft, at the end of one hour, for the corresponding directions of flight. The applied wind vector should represent the average wind effecting the aircraft during the first hour. Application of the wind existing near the air-position arc is incorrect procedure. The established positions are identical with positions determined by a series of elementary dead-reckoning triangles, the only difference being in the application of mass production technique to the problem. These points are then faired free hand, to form a locus of forecast position at the end of one hour. Such an arc is termed a "Time Front." (Labeled TF_1

(Continued on page 34)



What Minimum Equipment is Necessary for Effective Utilization of Business Aircraft on High Density Airways?



AUGUST 1956

The Hawk's Nest
LaGuardia Airport

- Complex Equipment Without "Know-How" can be Dangerous
- Balance Necessary Between Equipment and Weight Penalty
- Omni, ADF, Directional Gyro Seem "Musts" for High-Density Areas; Multi-Channel VHF, Artificial Horizon Desirable Options
- Adding Equipment Adds Power-Drain Problems
- "Whistle-Stop" Tuning is Personal Plane Version of Expensive Crystal-Controlled Transceivers.
- Extended Ground Radar May Ease Some Equipment Problems.
- Best Anti-Icing Equipment is Pre-Flight Planning
- Rain Repellents Successful in "VFR" Rain Areas

Moderator Neville E. Watson (Chief Pilot for C. V. Starr and Company): "We have SKYWAYS to thank not only for assembling this group, but also for its consistent efforts to help all of us in our business flying problems. Today's topic for discussion is the important question, 'What Minimum Instrumentation and Equipment is Necessary for Efficient Utilization of Business Aircraft on High Density Airways?' There'll be plenty of pros and cons, I know, but we'll try to keep to the topic. Let's start off by calling on Vic Schrager, Chief Pilot of Air Associates, who operates an Aero Commander, as well as various Cessnas and Tri-Pacers."

Victor Schrager (Executive Assistant to the President, Air Associates, Inc.): "Did I understand, Nev, that this was minimum instrumentation required for IFR, or VFR only, or any kind of operation? If VFR, we have no problem. If it's for marginal VFR or full IFR conditions, do we take into consideration limitations of the equipment and the pilot? Naturally there would be practical limitations on the size and weight of the equipment."

Watson: "Maybe I can clarify this a little better. The main idea is to try to determine what minimum equipment would be necessary for a man to get maximum practical utilization out of his airplane. He is not an airline pilot, he is not trying to keep a schedule; what does he need to enable him to go, for instance, on a day such as today, when marginal or slightly better conditions exist."

Schrager: "In my opinion, the minimum navigation equipment for en route procedures and instrument approaches that he would require would be at least one VOR and one ADF. Almost all instrument procedures, at least from now on, will require the use of non-directional low-frequency facilities, and there is just no way to use them without an ADF. You could possibly do it with two VOR's, but I think the more flexible combination would be one VOR and one ADF, minimum. Do you want to include communication equipment in this discussion also?"

Watson: "Yes, Vic, I think communications figures importantly into our topic."

Schrager: "Well, that's a very extensive subject all by itself. If you want to do things right and avoid hardships for the controllers, you must have enough frequencies to work all the Centers, all the towers, and more things. At the last count you needed about 40 frequencies to do everything right, at least around here. Of course, you can get by with less, but it seems to me such procedure causes great strain on the control personnel. I should say you should have a sufficient number of channels for all communications, and some sort of a standby set. Most people settle for a good deal less—about five or ten channels and a separate low frequency for ranges. You can usually scrape along with an omni and an ADF, and most of the VOR receivers available now are also usable for the ILS runway localizers. Marker beacon receivers are not absolutely required, but as you know they are very desirable. If you can't have an ADF, I should say you must have a 75-megacycle-marker-beacon receiver, or you could never know how far out you are on an instrument approach. With that much equipment, I think you could get along reasonably well in most IFR flights in high density areas. Of course, it's desirable to have more than that. I should say that this is my idea of the minimum, but if I were fitting out an airplane, I should certainly want much more."

Watson: "And now, Mr. Lou Ranley, you being an instrument flight instructor, would you carry on?"

Louis Ranley (Instrument Instructor, Teterboro Airport): "Most pilots would like an ADF Omni and a marker beacon. I consider this minimum for instrument conditions. Of course, the more equipment and frequencies at your disposal, the better one feels. Consideration must be given to the person using this equipment; if a ship is fully equipped and the pilot is not qualified to use the equipment, it becomes useless and confusing to him. I believe Vic Schrager stated quite well the essential equipment for travel in high density areas."

Watson: "Remember that we are concerned with the high-density airway. Mr. Al Nogard, as a Safety Agent of CAA, what do you think?"

Al Nogard (Supervising Agent, CAA): "I think there is quite a line of demarkation. As the discussion is now going I find myself wondering whether we are discussing actual instrument flying or marginal VFR."

Watson: "That's one of the problems we must discuss. Do we mean a marginal condition or full IFR condition? As we know, the marginal condition changes to a full IFR very rapidly. Let's think in terms of safety and utilization."

Max Karant (Asst. General Manager, Aircraft Owners and Pilots Assn.): "I agree with Al. We had better be very clear what we're talking about. At the present time the civil air regulations do require certain minimum equipment for IFR operations. The problem is not IFR operations, but VFR: what minimums should be required for VFR operations which are not required now? I don't believe there are any minimums for radio equipment or instruments for VFR, and the marginal VFR would, of course, have to come under that. The controversies that rage around the country at the moment are all dealing primarily with VFR and the problems of VFR traffic trying to get in and out when pure IFR operations are also underway."

Watson: "I think in our discussion we have to include some IFR, because we are also concerned with the pilot who would like to get out of this local area under IFR conditions, and head for a VFR destination—or leave here VFR and experience a little en route IFR weather, and then VFR weather at his destination. Let's assume that he's not going to fly when conditions are down to airline minimums."

Karant: "Then you are definitely talking about a man who holds an instrument rating."

Watson: "No, we're talking about the equipment necessary for the business pilot who wants to use his airplane enough to justify it."

Karant: "Are we still going to talk about pilot qualifications?"

Watson: "No, this is strictly equipment and instrumentation. I would like to call on Dr. Raymond, Aviation Medical Examiner for the C.A.A., who does a substantial amount of business flying in his Navion."

Dr. L. F. Raymond (ATR Medical Examiner, CAA): "You have a navigation problem and a marginal weather problem. You've got plenty of need for navigation and instruments now. No minimums exist for that. There are minimums spelled out, poor as they may be, for IFR operations. There are minimums for the aircraft, for the pilot, for the limits to which he can fly. Boosting the minimum equipment requirements of the IFR regulations today would be boosting safety."

Watson: "Well, suppose we discuss it both ways—for VFR and IFR. First Dr. Raymond, let's take it on a VFR basis."

Raymond: "I feel like a freshman in medical school here with all these pros, since I've only been flying for about four years. But my flying has been over 500 hours already. This problem is typical of some that I have encountered: I'd fly out of Morristown and go into Linden for my service. Linden happens to be near the Outer Marker for the ILS approach to Newark Airport. So-called marginal VFR weather is often encountered in this area, with a 1000 foot ceiling and the possibility of a Constellation breaking through the overcast. There may be only a few miles' visibility and aircraft letting down near my VFR track. I have always feared this condition. So when I'd get half-way between Morristown and Linden, I'd call the Newark tower and ask what's in the area and tell them where I'm going. I feel that's safety on my part."

"Now, as for equipment I'd carry in my plane: I don't think anybody should fly around in high-density areas without an ADF and omni. Of course I use my omni-radio for tower communications, which isn't good if you should have to use your omni for navigation. I think that's probably one of the reasons many of us get into trouble. I've talked to many pilots around the airports in this area, and many don't know that Linden is near the Outer Marker for Newark. They fly in marginal conditions and somehow or other they get back."

"Sometimes a pilot walks into this weather before he knows it. If he has, and knows how to use, adequate equipment, he can usually get out of it. If he can contact the Center, or Newark Radar Control, they can spot him on the screen. I'll give you an experience that I had one night when coming down from Connecticut with a pilot who was getting ready to fly for the airlines. It was at



MODERATOR Neville E. Watson and the Minimum Equipment Round Table participants: Louis Achitoff, Ronald Bamber, Dudley Blanchard, W. D. Crawford, Max Karant, Leo Marshall, A. J.

Nogard, Louis Ranley, Louis Raymond, Mrs. John Renna, Dorothy Richardson, George Robertson, Victor Schrager, John Sellers, and Don Thayer.

ROUND TABLE PARTICIPANTS



NEVILLE E. WATSON, Moderator, is Chief Pilot of C. V. Starr & Co., Inc., has been an executive pilot since 1946. He is a former instrument flight instructor for PAA.

LOUIS ACHITOFF, Assistant to the President of Flight Safety, Inc., holds an ATR and is Flight Examiner for DC-3, DC-4, etc.; was flight test engineer for CAA.

RONALD BAMBER, Vice President of Stamford Engineering Works, Stamford, Conn., has had about two years of flying experience.

DUDLEY F. BLANCHARD, Assistant to the President, Wyatt, Inc., has been flying since 1940. Lieut. J. G., U.S.N.R., he holds ATR, SMEL, SES and Helicopter ratings.

W. D. CRAWFORD, Field Representative for Associated Aviation Underwriters, has been with this company since 1946; was Marine pilot in World War II and Korea.

MAX KARANT, Assistant General Manager of Aircraft Owners and Pilots Association, has been private flying's spokesman for many years; is licensed pilot.

LEO G. MARSHALL, Chief Airways Operations Specialist at Philadelphia International Airport, has been a CAA traffic controller for fourteen years; private pilot for fifteen years.

A. J. NOGARD, CAA Supervising Agent at Teterboro Airport, soloed in 1933; member of QB's; fixed base operator, 1935-1940; CAA Safety Agent since 1941.

LOUIS RANLEY, Instructor at Teterboro Airport Instrument School, served on Ferry Command and Air Transport Command, is commercial and instrument examiner and executive pilot.

LOUIS F. RAYMOND, M. D., is ATR Medical Examiner for the CAA and consultant medical examiner for United Airlines; owns a Navion.

MRS. JOHN RENNA is a designer for Doris Day Furs, Inc., of which her husband, John Renna, is president; she has been a business pilot for the past thirteen years.

MRS. DOROTHY RICHARDSON has been Secretary to the President of Flight Safety since 1954. She served previously with the NATCC and PAA.

GEORGE E. ROBERTSON has been Assistant Chief of New York's Air Route Traffic Control Center since 1946. Formerly with Air Force; holds a captaincy in Air Force Reserve.

VICTOR SCHRAGER, Executive Assistant to the President of Air Associates, Inc., and Chief Pilot for that firm. He served as naval officer from 1940-1951.

JOHN SELLERS, Technical Supervisor of the Aviation Dept. of Insurance Co. of North America since 1945, was an engineering officer in the Air Force during World War II. Holds A&E license.

DON O. THAYER, President of Don O. Thayer, Inc., is U. S. representative for the Minox camera; owns Cessna 310.

night, and he wasn't sure of himself and didn't believe his instruments. I knew we weren't over Morristown yet, by the speed we were making, but he swore that we'd passed Morristown. He didn't know that Newark could give directional fixes in VFR weather, so I had to prove to him that the radio was right and he was wrong. Just about this time Newark gave us our fix, and we spotted the airport. Now there's a fellow that's getting ready to fly for the airlines and doesn't know about these facilities. It seems to me that not enough pilots are aware of this equipment, nor do they know how to use it. Most of the fellows hereabouts don't read their Airmen's Guide."

Watson: "That's fine Dr. Raymond. You've brought up a point we intended to touch on a little later: the necessity for pilots to check on all current facilities flying in this high-density area, either in VFR or IFR. We might also consider whether it would be essential for pilots to carry a Jeppesen Airways Radio Manual, the Coast and Geodetic Radio-Facility charts, the SKYWAYS Airport Directory or that little section in SKYWAYS each month—I think they call it 'Air-Aids Spotlight'—which gives radio-change information.

"Mr. Blanchard, would you like to add something?"

Dudley F. Blanchard (Assistant to the President, Wyatt, Inc.): "I tend to agree with the Doctor. Of course, we're getting away from minimum instrumentation, so to speak. I'm an ATR pilot, but I hope I'm not like the one the Doctor was arguing with the other night. I think that if it's VFR and the fellow's a good pilot, with a sound approach to pilotage, the two-way radio for communications is sufficient in VFR weather. Even in high-density areas, with accurate pilotage he can certainly find the WCBS broadcasting station tower, as well as Portchester,

New Rochelle, and similar reporting points. This puts minimum equipment for VFR weather at suitable two-way radio, adequate area charts for pilotage and a good knowledge of the same. Suitable two-way radio is a varying quantity. Most equipment for light aircraft is in the 2 to 8 watt power range. This seems to be adequate for en route reporting, but is frequently overpowered by airline equipment in high-density areas. This can create a serious problem during IFR weather in these areas. Reports are delayed beyond marginal limits because of it."

Nogard: "If I were coming into the New York Metropolitan Area on an instrument flight with a low frequency receiver as my only radio aid, I am afraid it would create a rather difficult situation for the controllers and other traffic in the New York Area."

George Robertson (Assistant Chief, CAA New York Air Route Traffic Control Center): "We are progressing day by day toward utilizing a one-airway system. Presently we have both low frequency and VOR airways. As we commission additional VOR's, we continue to increase VOR utilization and use less low frequency. Today there may still be a need for a low-frequency receiver for let-down at specific airports, but a VOR receiver is required to fly preferential routes both inbound and outbound to this terminal area. Therefore, with a primary VOR airway system and a possible need for low frequency approaches, you would need a low-frequency receiver and a VOR receiver for navigating VOR airways and for holding at VOR intersections."

Blanchard: "In other words, you still have low-frequency airways?"

Robertson: "Yes, we do. We have less today than we

(Continued on page 26)



AUTOMOBILE DEALER: Jim Cashman, a General Motors dealer in Las Vegas says, "I couldn't get along without my Cessna 310. It makes possible a lot of business travel which I couldn't undertake any other way. I call it my magic carpet because that's what it really is to me and my business."



OILMAN: John Myers, former Lockheed engineering test pilot, says, "I wanted a comparison so I flew the Cessna 310 and others before I made up my mind. The 310 is extremely efficient, easy to handle. Its good power loading gives excellent acceleration, gets me into and out of short fields, easily."

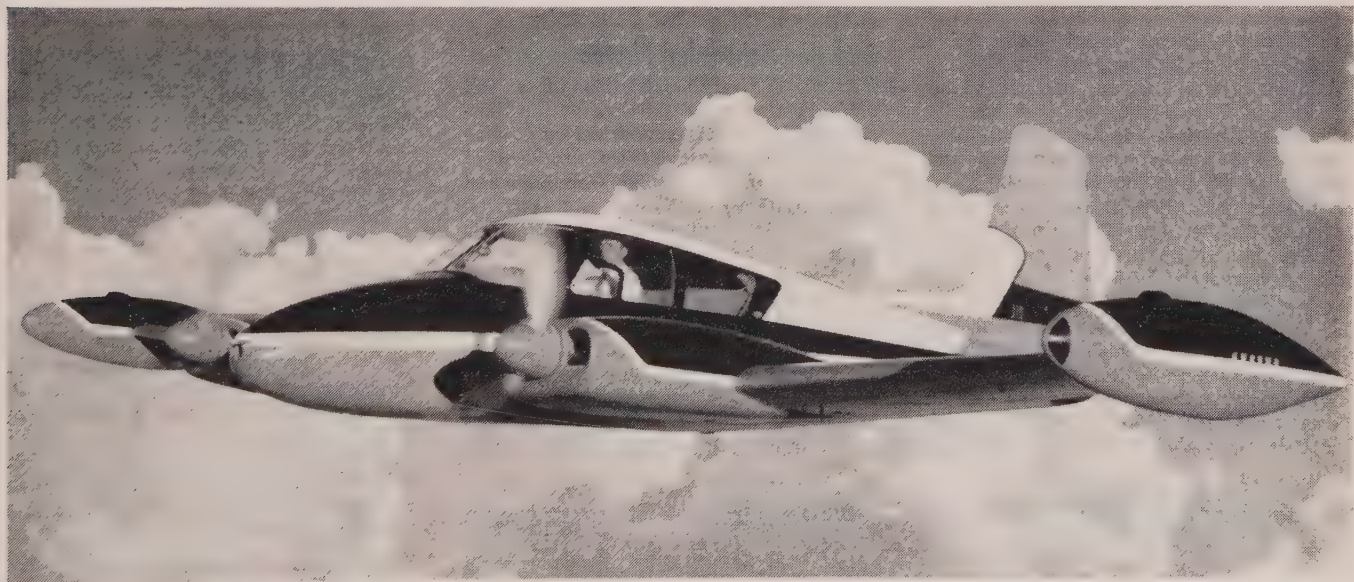


CONTRACTOR: Rupert Chisholm's business interests are spread from Southern California to Alaska. Mr. Chisholm covers this territory in his own Cessna 310. "The more I fly it, the more I like it," says Chisholm. "The 310 is faster. Handles easy, too. I looked over a lot of airplanes before I bought my Cessna 310."

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safety features. Why buy less than the most advanced design—the most advanced engineering? Only \$54,950 f.o.b. Wichita. See your Cessna dealer (Yellow Pages of phone book) or write CESSNA AIRCRAFT CO., DEPT. S-10, Wichita, Kansas.

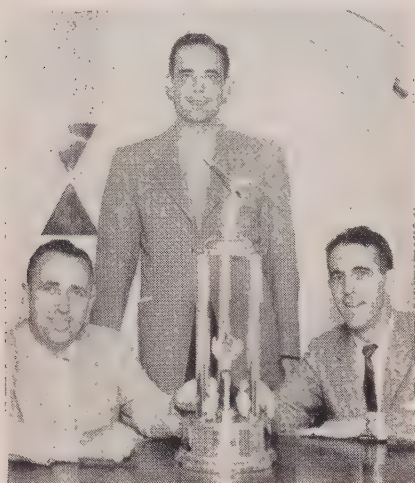


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SKYWAYS FOR BUSINESS

News Notes for Pilots, Plane Owners Operating Aircraft in the Interest of Business

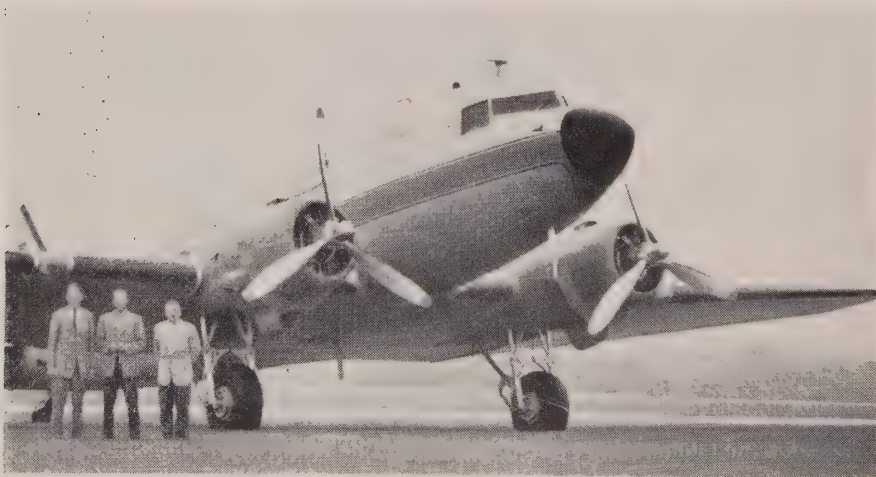


CREW of Alcoa DC-3 with trophy: (l to r) Wm. Abbott, Wm. Soulligny, D. L. Flannery

Alcoa DC-3 "Flagship Of U.S. Industrial Fleet"

Reading, Pa. The DC-3 executive transport of the Aluminum Company of America was named the "Flagship of the U.S. Industrial Fleet" at the Seventh Annual Maintenance and Operations Meeting, held by Reading Aviation Service, Inc., on June 2nd. Modification of Alcoa's plane was performed by Piedmont Aviation. The Kewanee Oil Company DC-3 was a close runner-up and winner of the Best Interior award.

In this connection, it is interesting to observe that on June 25, 1956 the DC-3 design passed its 20th anniversary. Although introduced by American Airlines in 1936, there are still about 5000 DC-3's still in use in executive service and on freight and feeder lines. The DC-3 demonstrates that an airplane can be used indefinitely with proper maintenance, and the citation given to Alcoa's DC-3 represents the ultimate honor in the DC-3's long record.



ALCOA'S Executive DC-3, prizewinner at Reading Operations and Maintenance meeting

Executive Flight Center For Chicago Under Development at Joliet Airport

Joliet, Ill. An executive flight center for the Chicago metropolitan area is under development at the Joliet Municipal Airport, the only field in the area, except the Midway and O'Hare air terminals, with approved LF and Omni instrument approaches and CAA communications station. The development is under the direction of Max Conrad, famed distance pilot.

A weather station will open soon at the airport. Twenty-four hour service has been initiated, new runway lights are being installed, and there are free sleeping-accommodations for pilots. Rental autos are immediately available at the field; 80, 91 and 100-octane gasolines are sold.

Although present hangars will accommodate the largest executive planes, additional facilities will be built late this summer.

The Joliet airport will become the service base for Max Conrad's world-wide aircraft ferry-service.

Newark Air Service Expands Hangar Facilities for Corporate And Non-Scheduled Planes

Newark, N.J. The initiation of a full modernization and expansion for the Newark Air Service was announced by C. William Drake, Executive Vice President of the parent company, Lehigh Warehouse and Transportation Co., Newark.

Engineering and construction work is expected to be completed by October 1st. The new facilities, according to Mr. Drake, will be equipped to undertake "Plane modifications, overhauls, pilot service, major repairs, inspections, engine changes" on aircraft ranging from Beechcrafts to DC-7's.

The new facilities at Newark will contain over a million cubic feet in a hangar

320 by 130 feet. The central part of the hangar is constructed to rise to 42 feet to accommodate the larger aircraft. A higher certificate rating for Newark Air Service is anticipated as a result of the modernization.

Other refinements of Newark Air's new facilities will be: a passenger lounge, conference rooms, catering service and ground transportation by limousine twenty minutes from mid-town New York.

C. R. Anthony Takes Delivery Of New 680 Aero Commander

Oklahoma City, Okla. C. R. Anthony, President of the C. R. Anthony Co., chain of department stores in the west, has taken delivery on a new model 680 Aero Commander.

It is the first airplane for the 33-year old company which operates stores in 18 states. It will be used for executive transportation by Mr. Anthony and his officials.

L. E. Surber, former pilot for the Sinclair Pipe Line Co., was employed to head up the company's new aviation department.

Lowest-Pressure Aircraft Tires For Marginal Landing Areas

Akron, Ohio. A new development of the Aviation Products Div. of Goodyear Tire and Rubber Co. promises greater safety to pilots facing the hazards of getting their aircraft in and out of unimproved areas.

Terra-Tires, 24 inches wide at the tread, with extremely thin, pliable walls and inflated to between three and eight pounds per square inch, are expected to absorb shocks and conform to uneven surfaces without resistance, and to pass over soft surfaces, like snow, sand or marsh without bogging down.

Goodyear has equipped a Stinson Voyager with Terra-Tires for test purposes, and has been landing and taking off from marginal landing areas. The tests are expected to confirm the anticipated value of Terra-Tires to flying ranchers, farmers, and loggers.

DeHavilland Beavers For Venezuela Freight Line

Downsview, Ontario. DeHavilland Aircraft of Canada announced the delivery of two Beaver aircraft to RANSA (Rutas Aereas Nacionales S.A.) of Venezuela, a schedule and charter freight service principally engaged in transporting meat from the producing regions to Caracas.

The planes will also be used for the transportation of personnel and their equipment, air-lifting of materials and supplies, and service for casualties and emergencies.

Because they will be operating from improvised airstrips under conditions of high altitude, heat, humidity and rainfall, the

ruggedness of the Beaver, proved in many operations in remote parts of Canada, will be a great asset in this new operational area.

Frye Unveils Mockup Of Multi-Engine "Bush" Plane

Fort Worth, Tex. Corporations operating mixed cargo-personnel aircraft into small strips in remote areas like Canadian, Central and South American mining and lumbering operators, will be interested in the mock-up of The Frye Corp.'s F-1 Safari, to be seen at the aircraft builder's Fort Worth headquarters, showing full-scale for the first time the new airliner's design for easy cargo handling and passenger comfort.

More than quadrupling the capacity of the well-known Beaver or Otter type "bush" plane, the version displayed was the combination cargo-passenger type F-1, powered by four 600-hp Pratt & Whitney Wasp engines. The rejuvenated Ford Trimotor represents the only current offering in this growing field.

The F-1 features a built-in Cargon system, clamshell nose doors and truck-bed-height cargo deck that permit loading and unloading full cargo payloads during a 10-minute scheduled stop. Also shown was the combination Safari's 25-seat passenger cabin, with more legroom between seats than any but luxury airliners.

Jack Frye, President, characterized the Safari as "a simple, rugged airplane that can operate from small airports at the lowest possible seat and ton-mile costs. It can be operated and maintained with modest facilities and skill."

Fence-Post Airlift For New Zealand Sheep Ranchers

Buck Haven, Pa. Pre-stressed concrete fenceposts are being delivered to New Zealand sheep ranchers from bomb racks mounted under the wings of a 150-hp Piper Super Cub.

In addition to airlift services, Super Cubs are also used "down under" for crop spraying and dusting. To date, twenty-one Piper planes, from Cubs to twin-engine Apaches, have been delivered to the New Zealand distributor, Airwork (NZ) Ltd., at Christ Church. Eighteen more Super Cubs are on order.

Link to Acquire 95% of Burton Rodgers Stock

Tulsa, Okla. Burton-Rodgers Technical Training Aids, Inc., of Tulsa, and Link Aviation, Inc., Binghamton, N.Y., are negotiating a deal by which Link would acquire 95% of the stock of the Tulsa firm.

Technical Training Aids, Inc., was merged last August with the Burton-Rodgers Co. of Cincinnati, and the firm has operated since under the combined name. The Tulsa firm has been active in building DC-7 cabin mock-ups to train airline crews, plus classified military contracts.

Russell Hunt, Chairman of the Board of the Tulsa company, said negotiations probably will be completed in August.

(Continued on page 38)

... in the business hangar

■ Spartan Aircraft Co., Tulsa, Okla., has completed the rebuilding of a DC-3 brought by Corning Glass Works for executive modification. Modifications included removal of the cargo deck and complete renovation of the interior to deluxe accommodations for 15 persons. Complete new instrument panel was augmented by an RCA AVQ-10 weather and terrain radar, with Fiberglas nose to house the antenna. Two Collins 51-R3 Omni with full instrumentation were installed with a radio magnetic indicator on the pilot's side of the panel along with an integrated flight system. Dual Collins 51V-2 glide slope receivers were installed, as well as a Narco DME. A converted Packard auto radio was installed for passengers, and an automatic 20,000 BTU heater in the fuselage. Corning colors were applied to the exterior by the "hot mix" method. □ Spartan completed 100-hour inspection of the Lockheed Lodestar and Beechcraft brought by pilot Frank Dent from Skelly Oil Co. □ The Beechcraft of Lubrizol Corp., Shreveport, was brought by Pilot Ken Daugherty to Spartan for 100-hour inspection, relicensing and propeller overhaul. □ 100-hour inspection made of Sheridan Oil's Beechcraft, Walter R. Reese, Pilot.

■ Chamberlain Aviation, Inc., Akron, is installing Collins W0101 radar systems, CAIR radome, new generators and executive interiors in the three DC-3's from Procter and Gamble Co. □ Work is nearing completion at Chamberlain Aviation on Oasis Oil Co. of Libya's DC-3. When the air plane leaves for its Tripoli base, it will be equipped with complete new interior, radio installation and instrument panel with newly-covered control surfaces, completely overhauled hydraulic system, wing attach-angle modification, and fresh paint job. □ Ohio Oil Co.'s recently acquired DC-3 was brought to Chamberlain Aviation for a new executive interior, paint job, and complete Collins radio installation. M. C. Murphy is Ohio Oil's NBAA representative. □ Thompson Products brought one of their DC-3's to Chamberlain for repairing and double engine change. □ Chamberlain Aviation, Inc., has been awarded the Aero Commander airplane franchise for the Northern Ohio territory; announcement was made by Aero Design and Engineering Co., NBAA member, Oklahoma City, Okla.

■ Dallas Airmotive, Inc., Dallas, was host to Fred Street, Senior Engine Specialist, whose visit concerned time extension and overhaul of their Pratt & Whitney R-2800 Convair engine and Wright R-1820 for their DC-3's. □ Dallas Airmotive was awarded a contract for the overhaul of all CAA Aeronautical Center's Pratt & Whitney R-985, R-1830, and R-2000 engines; contract was awarded by Paul Shirley, Purchasing Administrator for the Aeronautical Center. □ Rex Creighton, Director of Purchasing, and Ellwyn E. Boock, Superintendent of Maintenance, Ozark Airlines, visited Dallas Airmotive to renew their contract for the overhaul of their Pratt & Whitney R-1830 engines.

■ Mattituck Airbase Corp., Linden, N.J., completed 100-hour inspection and oil-cooler modification on the Super Widgeon flown by Pilot Chuck Evans for the Fish and Wildlife Section of the Dept. of the Interior. □ Alpine Airways' Super Widgeon was brought to Mattituck by General (Slim) Halstead for 100-hour inspection and minor alterations. □ Andy Stinis picked up his Grumman Widgeon from Mattituck after completion of 100-hour inspection and a new multicolor paint job.

■ Remmert-Werner, Inc., St. Louis, has completed a new executive interior in the Vickers Viscount flown in from the Dept. of Transportation of Canada by Pilot Jack Hunter. □ Bob Scott brought the Allis-Chalmers DC-3 into Remmert-Werner's Engine Works for a double engine change of his two R-1830-75 engines. □ Walt Pague had the Armco Steel DC-3 in at R-W for installation of a geared rudder-tab. □ Trailmobile's Lodestar, Carl Seimer, Pilot, was brought to R-W's engine works, St. Louis, for a double change of his Super-92 engines. □ A Lodestar double engine change was also made on Life and Casualty Co.'s ship, Bob Stone, Pilot, and installation of a Sperry Rate Unit for crosswind on his Zero Reader. □ The Mead-Johnson Co., Evansville, has a new executive DC-3 from Remmert-Werner, equipped with Collins 17L4-51X VHF communications, Collins dual 51R3 Omni with dual RMI Radio Magnetic Indicators, Collins 51Z marker, dual Bendix ADF with flush loops, Bendix Omni-Mag, Sperry H6 electric gyro horizon, Sperry C4 gyrosyn compass, and custom radio and instrument panels. □ Sinclair Refining Co. has two new Custom-18 conversions from Remmert-Werner, complete with picture windows, enlarged cabins, modified bulkhead, adjustable reclining chairs and deluxe interiors. Henry W. Boggess is Sinclair's NBAA representative; Chief Pilot is Dave Peterson. □ Skip Wittner has the Kewanee Oil Co. Super-92 DC-3 at Remmert-Werner for a double change of his -92 engines, modification of cowl flaps and oil tanks, retractable tail wheel, short exhaust stacks, new R-W landing-gear cover doors, and a hinged radome and hinged scanner for the radar.

(Continued on page 41)

Navigation **NAVICOM** Communication

Procedures, Regulations for Navigation, Communication in Flight Operations

New Transceiver For Executive Twins

A new VHF Aircraft Communications Transceiver for operation on 180 or 360 Channels has been announced by Dare, Inc., Troy, Ohio, outstanding makers of aircraft communication and navigation equipment, especially in the light-twin and executive aircraft field.

The new transceiver, designated the model DTR-18/36 has been designed as a moderate priced low-weight communications unit for airline, executive and corporate aircraft. Frequency coverage is from 118.0 mc. to 135.95 mc. When supplied for 180 channel operation, channels occur every 100 kc. thruout the covered band. With 360 channel operation, channels occur every 50 kc. The transceiver will operate as a simplex unit, providing transmission and reception on the same channel, or it can be supplied for cross-channel communications, in which case transmission and reception may be on different channels.

The entire unit is built on a 1/2 ATR rack and weighs only 22 pounds. Unitized construction is used thruout for easy installation and servicing. The transmitter provides a power output of 15 watts on any channel. A unique circuit eliminates the need for frequency doublers and triplers, and provides a frequency accuracy of .01%

or better. The unit is capable of a full 100% modulation.

The receiver provides a sensitivity of 2 microvolts for 150 milliwatt output. Signal-to-noise ratio is better than 6 to 1 on all channels. The extremely high receiver selectivity provides a 40 kc. bandwidth at 6 db. down and an 80 kc. bandwidth at 60 db. down. A built-in squelch, with a control on the front panel of the unit is adjustable for levels of 1 to 15 microvolts.

Tuning is accomplished remotely from Dare backlighted controls. A unique crystal saver circuit employs *only 38 crystals* for 180 channel operation and 58 crystals for 360 channel operation. Only ten wires from the Dare Control to the unit are required for inter-connection. A *concentrically mounted volume control* is provided as part of the control head. Where cross-channel operation is desired, two Dare Control Heads are employed, one for transmitter frequency selection, one for receiver.

The Power Supply Unit of the transceiver, provides power and also serves as receiver power output stage, and transmitter speech modulator. Power is supplied by a precision dynamotor. Two voltage regulator tubes assure stable voltage to all RF and IF stages. The unit is available for either 14 or 28 volt operation. Receiver

Power Output stage provides up to 8 watts of audio power, ample for loud-speaker operation even under the most adverse conditions.

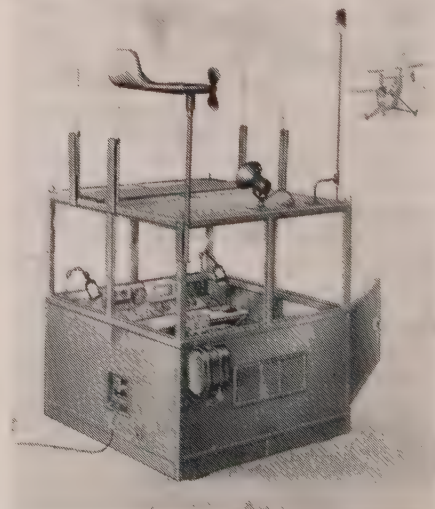
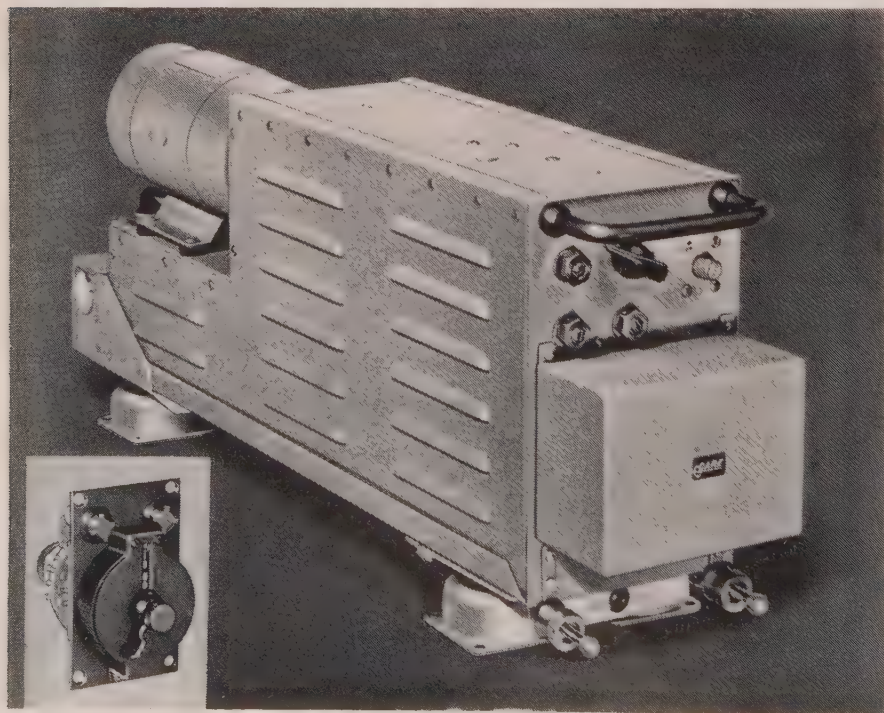
Operation of the new Dare transceiver is simple. The unit is turned on, the proper channel is selected, and the unit automatically is placed in Receiver operation. Pushing the microphone button actuates an internal coaxial relay which switches the unit from Receive to Transmit.

Any 52-ohm broadband VHF communication antenna may be used. The entire unit employs 19 ruggedized vacuum tubes and one germanium diode. Price of the unit for 180 channel simplex operation, including shock mount is approximately \$2500.

Packaged Tower For Corporate Airports

The complete airport control tower shown above is easily transportable by helicopter, truck, or cargo plane. It is a complete single unit package easily and quickly prepared for transit. It is complete enough to provide permanent operating control for military or civilian airports yet compact enough, light enough, and mobile enough to be moved to a totally new location in a matter of minutes.

This unit, designed and manufactured by Wickes Engineering and Construction Company of Camden, New Jersey, includes radio telephone, transmitting and receiving equipment, aerological instruments, field lighting control facilities for two operators, built-in air conditioner and heater. It can be set up and operated anywhere



with only the main power connections needed. It provides and maintains complete airground communications and controls all available field lighting.

Originally designed solely for military use it is now available as auxiliary equipment for large commercial fields and is prime equipment for emergency fields and smaller airports, often the base for corporation aircraft or working fleets in mining or other development areas.

Sub-Miniature Power Supply for Light Planes

The Instrument and Electronics Division of Land-Air, Incorporated; Oakland, Cal. announces development and production of a sub-miniature power supply designed to provide B+ and filament voltages to various types of airborne equipment.



Unique transformer design and use of silicon rectifiers insures high temperature operation in an extremely small package, 1" x 3" x 9" weighing only two pounds, four ounces. This facilitates installations in normally unusable spaces, and decreases weight problems which may be created by installation in critically balanced aircraft. This is especially true with the single-engine and light-twin class of business aircraft.

Operating from 115 vac, 400 cycle input power, the power supply provides 160 volts DC at a nominal 100 milliamperes and 6.3 vac at 5 amperes. Although unregulated, this unit has an inherent regulation factor of 7½% from zero to full load. Units may be interconnected to provide increased voltage or current capabilities.

Air-Aids Spotlight

ALLENTOWN, Pa.—VOR due shut down in September.

AMBER 9—VICTOR 1, N. C.—WILLIAMSTON VAR decommissioned; replaced by CO-FIELD VOR 10 miles west of HARRELSVILLE INT. on Victor 1, Victor 194, frequency 116.2, IDENT. "CDI."

ATLANTA, Ga.—Precision Approach Radar re-commissioned.

BILLINGS, Mont. — ADF Straight-in approach minimums and heavy twin-engine circling min. reduced to 400-1, 500-1.

BIRMINGHAM, Ala.—VOR shut down for modification.

CASPER, Wyo.—LFRRange approach Straight-in minimums for twin-engine reduced to 400-1 day and 400-1.5 night and missed approach climb-out changed to west course.

COLUMBUS, Ohio — Resumption of BVOR indefinite due to service deterioration caused by power line construction in area.

CORPUS CHRISTI, Tex.—BVOR shut down til early Sept.

CROSS CITY, Fla.—BVOR shut down until mid-September.

CUT BANK, Mont.—BVOR due to resume operation on 113.1mc.

DETROIT, Mich. — Instrument approach circling visibility lowered to 1 mi.

DULUTH, Minn.—VOR due to resume operation end of month.

EVANSVILLE, Ind.—ILS Outer Marker altitude now 1704'; missed approach instructions corrected to read 080° radial EVV-VOR and alternate missed approach procedure added.

FAIRFIELD, Utah — LFRRange finally decommissioned.

FLORENCE, S. C.—to RALEIGH, N. C.—FLORENCE LFRRange SW course swung south to 012° to line up with Amber 7; NE course swung west to 192° to intersect with new SW course of RALEIGH LFRRange now 048° coincident with Victor 3W west of Ft. Bragg restricted area. Look for re-designation of Amber 7; LUMBERTON routing now strictly ADF.

HUGUENOT, N. Y.—VOR due commissioning end of month on 112.9mc, "HUE," located on ridge 6 mi. E. of PORT JERVIS.

HUNTSVILLE, Ala.—Army operating tower at Redstone Arsenal Field for military and civilian aircraft in area until CAA

opens combined station/tower at Municipal about Jan. 1.

JACKSONVILLE, Fla.—ILS/ADF procedure turn altitude now 2000 ft.

JOPLIN, Mo.—ILS front course recommissioned; Outer Marker now 4.4 miles from end of runway, altitude 2130'; Middle Marker 0.5 miles, 1161'.

LANCASTER, Pa.—Straight-in landing minimums now 400-1.

LANSING, Mich.—VOR due resume operation end of month.

LITTLE ROCK, Ark.—ILS procedure turn now N. of course.

LONE ROCK, Wisc.—VOR due to resume operation first of Sept.

LOS ANGELES, Cal.—Circling minimums for light aircraft raised to 500'.

MEMPHIS, Tenn.—VOR due out during Sept.

MIAMI AREA—HOMESTEAD LFRRange replaced by radio beacon on 326 KC at same location; PERRINE LFRRange commissioned 16 mi. S.W. of MIAMI LFRRange on 266 KC, "PRR," courses 177° N 269° A 339° N and 047° A, latter aligned with SE edge of Blue 19 direct KEY WEST. Amber 7 now ADF.

MOBILE, Ala.—VOR shut down until mid-September.

MOLINE, Ill.—VOR out until mid-September.

NANTUCKET AREA—With decommissioning of NANTUCKET radio beacon, the HYANNIS, Mass RBn and MARTHA'S VINEYARD RBn will be controlled from NANTUCKET IN-SAC.

OKLAHOMA CITY, Okla.—Precision Approach Radar commissioned, LFRRange procedure turn altitude raised to 2500 ft, final over station now 2000 ft.

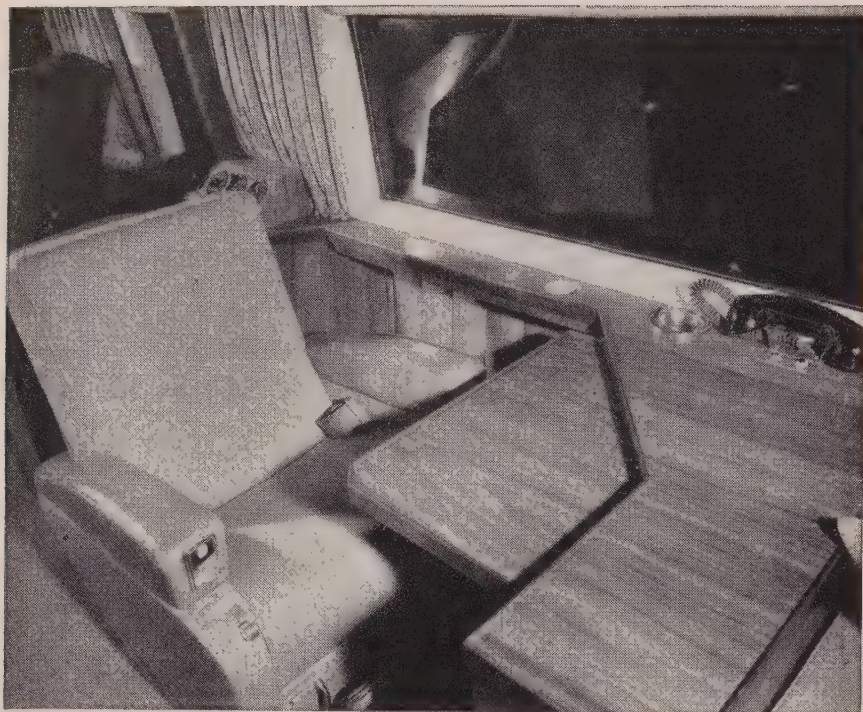
PHILLIPSBURG, Pa.—VOR/DME shut down until September for modification and installation of TACAN.

ROCKFORD, Ill.—MHW radio beacon commissioned 7 miles S. of airport on 275 KC, "RFD."

SHREVEPORT, La.—DOWNTOWN AIRPORT-control tower recommissioned by CAA-293 KC, 119.5 mc; guards all common frequencies.

WATERTOWN, S. Dak.—VOR shut down until early Sept.

YOUNGSTOWN, Ohio—ILS approach straight-in minimums raised to 300-½; ADF to 400-1.



sky office with Janitrol heat



Executive Aircraft Service, Inc., Dallas, specifies Janitrol heaters for their conversions. In their one hundredth, pictured above, they used a unique tail installation. A standard "off the shelf" 200,000 BTU/hr Janitrol unit is located in the baggage section . . . making room for a forward commissary, yet using existing ductwork with little modification. In placing the heater aft, they capitalize on the DC-3's normal back-to-front ventilation flow.

Standardization and quick availability of parts are two of many reasons why builders, owners, and conversion specialists like Executive Aircraft Service choose Janitrol heaters—a line proved in thousands of military, airline, and business aircraft. Modification centers and chief pilots are invited to request on letterhead Janitrol's catalog, containing installation tips and the complete line of standard heaters from 25,000 BTU/hr up.

50 years of combustion engineering



AIRCRAFT-AUTOMOTIVE DIVISION • SURFACE COMBUSTION CORPORATION • COLUMBUS 16, OHIO

CAA Offers Pilots Short Memory Course

Rupert Herr, veteran CAA pilot, finds that pilots who will read the accompanying story—looking up the identifying words with which he has taken poetic license—memorize the new aviation alphabet much faster and retain it longer than by rote learning.

"One day in N three Y named C, M and O—were playing G at the Q country club when they met J and her P at the ni-yenth.

"M danced a F but O asked her to T. C was the V and she accompanied him in his A-R to the I-H where they drank some W. Just as C was removing his U in burst P screaming, 'I'll K you.'

"S, P, C E'd, 'L alone, I was just going to show her my X's of the Z's from the country.'

"B, said P, whose name was really Roger Wilco!"

You don't know the alphabet as adopted by ICAO? All right, here it is:

A—Alfa	N—November
B—Bravo	O—Oscar
C—Charlie	P—Papa
D—Delta	Q—Quebec
E—Echo	R—Romeo
F—Foxtrot	S—Sierra
G—Golf	T—Tango
H—Hotel	U—Uniform
I—India	V—Victor
J—Juliett	W—Whiskey
K—Kilo	X—X-ray
L—Lima	Y—Yankee
M—Mike	Z—Zulu

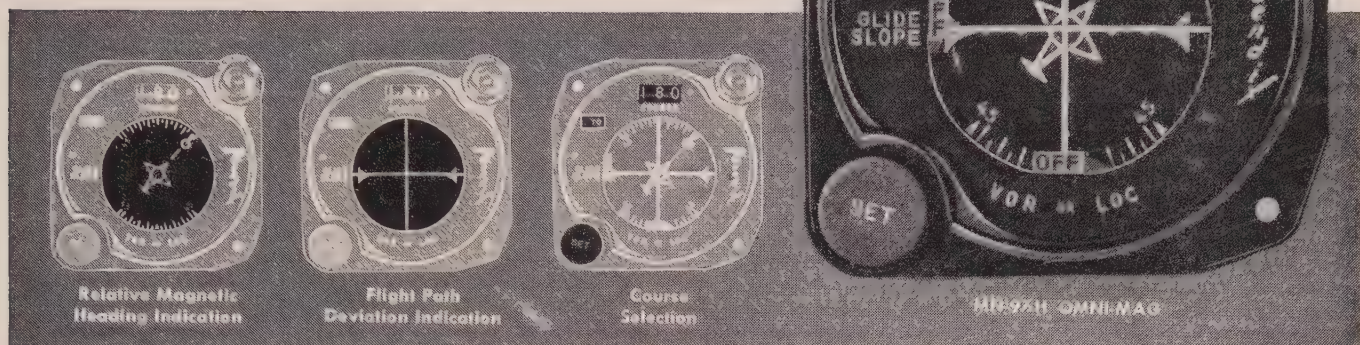
Report Due On Possible Compatible DME-TACAN

The Air Coordinating Committee has instructed its Air Traffic Control and Navigation Panel (NAV) in June to proceed immediately with the development of a plan for the instrumentation of the Federal Airways with navigational aids to supplement the present omni-range VOR and to provide clear channel (TACAN compatible) distance measuring equipment and the necessary airborne counterparts thereof in time to meet the need of the new high performance civil aircraft. It will be recalled that part of the VOR/DME-TACAN controversy was over the fact that TACAN demands the same frequency spectrum assigned to DME.

It further instructed the NAV Panel to prepare a factual report on the possibilities of an alternate Rho-Theta System which would combine the best features of equipments now in being plus any necessary modifications thereof. Both reports are to be completed as soon as possible and, in any

(Continued on page 42)

new **Bendix** expanded range OMNI-MAG

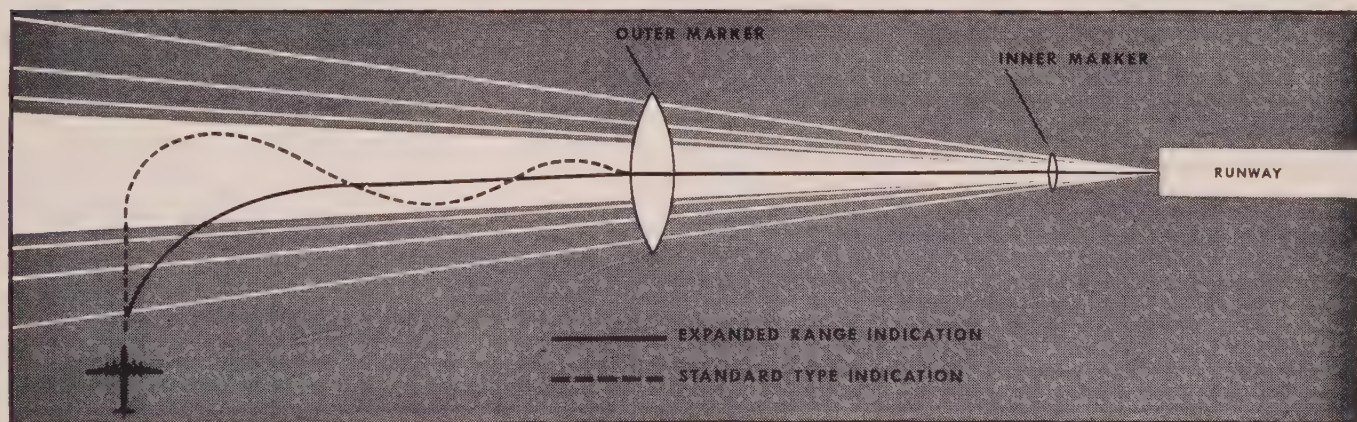


...combines 3 sources of VOR/ILS flight information on a single dial

Three vital VOR/ILS instruments in one ... that's the Bendix* Omni-Mag Indicator. It performs all the functions of a Relative Magnetic Heading Indicator, a Flight Path Deviation Indicator, and an Omni-Bearing Selector ... and combines the information from each on a single, easy-to-read dial.

With this 3-in-1 "pictorial" feature, the Bendix Omni-Mag has found wide acceptance

in the aviation industry. Twenty-nine airlines, more than 200 executive aircraft and hundreds of military aircraft are equipped with the Omni-Mag. Now, with the addition of an Expanded Range facility, the new MN-97H Omni-Mag takes its place as the lowest cost, most versatile, reliable and easiest to use VOR/ILS instrumentation system available.



...smooths out ILS approaches...eliminates need for bracketing

The Bendix Expanded Range Omni-Mag shows the pilot well in advance that he is approaching an ILS localizer beam. As a result, he can make a direct "close" on the beam, *without* the usual need for bracketing. By making possible more positive, quicker ILS approaches with considerably less maneuvering, the MN-97H promotes flight safety and helps reduce pilot fatigue.

For full details and specifications about this

new Bendix navigation instrument, write Bendix Radio, Aviation Electronic Products, Baltimore 4, Maryland. *Reg. U.S. Pat. Off.

Bendix Radio

Bendix Radio Division • Bendix Aviation Corporation • Baltimore 4, Md.
West Coast Sales: 10500 Magnolia Blvd., North Hollywood, California
Export Sales & Service:
Bendix International Division, 205 E. 42nd St., N. Y. 17, N. Y.
Canadian Distributor: Aviation Electric, 200 Laurentian Blvd., Montreal, Que.



Official NBAA Report

NATIONAL BUSINESS AIRCRAFT ASSOCIATION, INC.

(formerly Corporation Aircraft Owners Association)

National Business Aircraft Association, Inc. is a non-profit organization designed to promote the aviation interests of the member firms, to protect those interests from discriminating legislation by Federal, State or Municipal agencies, to enable business aircraft owners to be represented as a united front in all matters where organized action is necessary to bring about improvements in aircraft equipment and service, and to further the cause of safety and economy of operation. NBAA National Headquarters are located at Pennsylvania Building, Suite 344, 13th & Pennsylvania Avenue, N.W., Washington 4, D.C. Phone: National 8-0804.

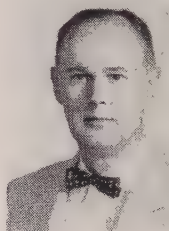
Jean DuBuque Resigns N.B.A.A.; William Lawton Named Successor

Mr. Jean H. DuBuque has tendered his resignation as Executive Director and Secretary of the National Business Aircraft Association, and Mr. William K. Lawton, Advertising and Public Relations Manager for L. B. Smith Aircraft Corp., Miami, has accepted the invitation of Henry W. Boggess, NBAA President, to act as new Executive Director.

Mr. Lawton, who has been connected with aviation since 1928, and who witnessed many of Aviation's early triumphs—Wiley Post's flight, Amelia Earhart, Doolittle, Lindbergh, Corrigan—soloed in April 1936, and at present holds Commercial Pilot's rating on land and sea aircraft. In addition to the Smith Corporation, he has served with Riddle Airlines, Inc., Braniff International Airways, and American Airlines.

Mr. Lawton was graduated from New York University with a B.A. in Journalism, won the Don R. Mellett Memorial Award for editorial excellence in 1940, and thereafter served with the Long Island Daily Press, New York Evening Post, Associated Press, Drennan News and Photo Service, Toledo News-Bee, and Standard News Association. He was stationed at Roosevelt and Mitchel Fields for the Associated Press, and in this capacity obtained the first information on Douglas Corrigan's "wrong-way" flight to Ireland. Mr. Lawton's by-line articles on Corrigan subsequently won citation as "Number One News Story—1938." During 1940 Mr. Lawton was Aviation Reporter for Standard News Association at LaGuardia Field, covering VIP movements, airline news, and interviewing personalities in all fields.

As Public Relations Representative for American Airlines, Mr. Lawton continued his work writing feature stories on airline



*William K. Lawton
Executive Director
and Secretary,
NBAA*

developments and news-worthy personalities. With Grant Advertising, in Miami, 1954-55, Mr. Lawton worked with various airline accounts, including National, Guest, and LACSA.

Mr. Lawton's military career extends intermittently back to 1933, when he joined the U.S. Naval Reserve aviation squadron at Floyd Bennett Field. From 1941 to 1946 he served in turn at the Naval Air Station at Norfolk, three years on the flagship of the Atlantic fleet, participating in every major invasion in the European-African theatre, and finally as Flight Control Officer for the Naval Air Transport Service at Olathe, Kansas. He received an honorable discharge in 1946 with the rank of Lieutenant Commander.

Mr. Lawton now resides in Miami with his wife Viete and their two children, Robert and Jean.

Short Range Navigation System Under Consideration By ACC

THE AIR COORDINATING COMMITTEE (ACC) met recently to consider a technical report of the Air Navigation Development Board (ANDB) on the program for electronic short distance navigation system. This report was particularly concerned with the clarification of past uncertainties involved in the proposed TACAN system.

It was apparent during the discussion which evolved around costs, time schedule for implementation, international considerations, and operational requirements, that the existing VOR aid to navigation would be required for the balance of its previously planned useful life (1965). However, the DME/TACAN controversy again has become "hot" as a result of the Air Navigation Development Board's (ANDB) recent statement that "its suitability applies whether that system is for civil and tactical military, or civil and not-tactical military aviation." The following full statement of NBAA's position on this issue was contained in a letter, dated June 6, 1956, from President Henry W. Boggess to the Under Secretary of Commerce for

Transportation, Louis S. Rothchild, who also serves as Chairman of the Air Coordinating Committee:

"Our Association is gravely concerned and disturbed regarding recent reported Washington developments in the Department of Defense and the Air Navigation Development Board which have re-opened the long-standing civil and military DME/TACAN controversy.

"As the representative for business aircraft owners and operators now logging over a half a billion airplane miles annually, NBAA strongly opposes the immediate adoption of TACAN as an element of the common system of air navigation. Such adoption would be in direct conflict with the agreement unanimously reached by the Air Coordinating Committee on April 20, 1955, and disregards the intent of Report #737 of the House of Representatives, entitled 'Military Procurement of Air Navigation Equipment,' dated June 8, 1955.

"It also is NBAA's firm contention that since the taxpayers already have a heavy investment of \$9,809,000 in 431 DME ground units, any additional public funds expended for experimental TACAN as an accepted element of the common system is an unwarranted added financial burden on the taxpayers. Furthermore, it would result in direct economic loss to the hundreds of civil aircraft users who have, with good faith in Government integrity, already invested well over a million dollars in DME airborne equipment.

"In testimony on May 3 before a House Appropriations Subcommittee, you stated that there had not been enough demand for DME. The demand is not proportioned to the need for the obvious reason that the demand is being stifled by the Federal Government through its official disfavor of continuing DME beyond 1960. As a consequence, only 241 DME ground units are in operation today, and 190 additional DME units now on site, are still awaiting commissioning for operation. The arbitrary issuance of a "freeze order" by the Department of Commerce, prohibiting the operation of these 190 available DME units, is depriving civil aircraft users and CAA air traffic controllers from sharing the full benefits of a most valuable position-reporting common system aid.

"As a businessman, you are well aware that the consumers demand for a product decreases when the value of the product is in question and a replacement has been ordered, although the present product adequately serves the consumers needs at a price he is willing to pay. This analogy certainly applies to DME. Business aircraft operators presently utilizing airborne DME are well satisfied with its accuracy and performance. Many of them have invested sizeable sums of money in this equipment to have the added advantage of its time-saving and safety factor for point to point air navigation, particularly in areas of high density air traffic.

"NBAA deplores the confusion and uncertainty that now exists because of the Military's demand that the TACAN distance measuring element replace the existing CAA distance measuring element. The vacillating position of the Department of Commerce on this issue is materially contributing to the hesitancy of business air-

craft operators to install commercially available DME airborne units. They are most reluctant to make a considerable financial investment in this equipment when it would become unusable and a total monetary loss if the TACAN element is adopted for the common system.

"The attempt of the Military services to impose on the common system of air navigation an incompatible tactical device is contrary to democratic processes. To so handicap this system, which has been in being for many years and probably coordinated, accepted, and agreed to initially by both the civil and military aviation authorities, will not only force an untimely burden on civil aviation interests, an untenable financial drain on taxpayers, but violate public trust.

"It is incomprehensible to the thousands of business aircraft users that those DME ground units now efficiently in operation, already bought and paid for, and tried and proven over a period of several years, should be suddenly declared inadequate or obsolete because the Military insists on publicly justifying its long secretive and staggering monetary investment in TACAN.

"May I direct your attention to the 'Air Lines Electronic Engineering Committee' Letter #56-2-23, dated May 16, 1956. Airline technical representatives go on record therein as favoring DME to TACAN, and also indicate interest in a retrofit installation of DME in present day as well as single on dual DME installation on new jet or turbo-prop aircraft to be delivered in 1959 and 1960. The letter also states that "ARINC Characteristic 521-A is being written around a common system DME rather than a TACAN system."

"As you well know, TACAN is still in an experimental stage. Airborne TACAN units are not available for civil aircraft. TACAN ground units have not been installed, operationally tested and proven acceptable for civil aircraft use. Therefore immediate adoption of TACAN will not only seriously effect the overall functioning of our hard won common system of air navigation, but prevent the user and taxpayer from receiving a deserved "return" on the extensive funds already invested in the common system. Why retard and jeopardize at this time the operation of DME? It has proved a vitally needed air navigation aid which adequately meets the technical requirements of all classes of pilots. Certainly, our civil aviation authorities will not accede to Military claims that, for tactical reasons, TACAN should be the accepted distance measuring element for the common system.

"May I respectfully request that this letter expressing our views on DME/TACAN be included in the official records of the ACC meeting on Thursday, June 7, 1956."

The Air Coordinating Committee in a subsequent meeting instructed its Air Traffic Control and Navigation Panel (NAV) of which NBAA is an industry member, to proceed with the development of a plan for the instrumentation of the Federal Airways with navigational aids to supplement the present omni-range VOR and to provide clear channel (TACAN compatible) distance measuring equipment and the necessary airborne counterparts thereof in time to meet the need of the new high

performance civil jet aircraft expected in 1959.

It further instructed the NAV Panel to prepare a factual report on the possibilities of an alternate Rho-Theta System which would combine the best features of equipments now in being plus any necessary modifications thereof.

The Air Traffic Control and Navigation Panel is composed of the responsible navigation and traffic control officials and experts of the Federal agencies and industry. It is under the chairmanship of the CAA Administrator, Mr. Charles J. Lowen.

The NAV Panel will operate on a full-time priority basis until its report is completed and transmitted to the Air Coordinating Committee.

General Aviation Fact Finding Program Under Way

NBAA, along with nine other national organizations representing the broad field of General Aviation recently met in Washington and completed plans for a three months program of fact-finding as a basis for its forthcoming recommendations to President Eisenhower's Special Assistant for Aviation Facilities Planning. Organized in Washington June 4, 1956, the General Aviation Facilities Planning Group voted to establish a Washington office staffed with an Executive Secretary to direct the Group's research and recommendations and to carry on liaison with all other groups, individuals, and agencies concerned with the critical air space and ground facilities problem.

The Group held its first meeting with its newly-elected Executive Committee composed of: Dwight P. Joyce, President of The Glidden Company, Cleveland, Ohio; Dr. Leslie A. Bryan, Director of the Institute of Aviation, University of Illinois, Urbana, Illinois; and Dwane L. Wallace, President, Cessna Aircraft Company, Wichita, Kansas, and elected George E. Hadaway, of Dallas, Texas, as general Chairman.

The Executive Committee called on Mr. Edward P. Curtis, Special Assistant for Aviation Facilities Planning, to formally advise him of the objectives of the Group and to ascertain the areas in which the Group could be most effective in assisting in his assignment by the President. The Group also met with representatives of the Aeronautical Research Foundation, who are under contract to the White House Office to undertake economic studies, and with representatives of Mr. Curtis' staff concerned with program planning and systems evaluation.

Reporting on the Executive Committee's meeting with Mr. Curtis, Dr. Bryan, Executive Committee Chairman, said, "We are convinced that no more important task in the recent history of general aviation has come our way. Our whole future is at stake in these deliberations. Facilities requirements during the next two decades must be established solely on the basis of fact—not fancy.

"Our efforts in establishing the facts and in determining our requirements, both on the ground and in the air space above us," Dr. Bryan continued, "will in a large measure depend upon the cooperation and

interest of every individual and company engaged in or utilizing business, industrial, agricultural and private aircraft."

The General Aviation Facilities Planning Group is composed of the following organizations, all of whom were represented at the meeting: Aeronautical Training Society; American Association of Airport Executives; Aviation Distributors & Manufacturers Association; Aircraft Owners and Pilots Association; National Association of State Aviation Officials; National Aviation Trades Association; National Business Aircraft Association; National Flying Farmers' Association; National Pilots Association; and the Utility Airplane Council of the Aircraft Industries Association.

Hazards in Radio Switching

Granting that high density areas make desirable full dual instrumentation and radio in executive aircraft, the addition of certain types of switching arrangements can result in over complexity and resulting hazardous operations. An example of this is the switch which is installed in some aircraft to permit the Captain to transfer the Copilot's navigational information of his own indicators.

Recently, an executive airplane departed from Colts Neck VOR direct to the LaGuardia ILS under actual instrument conditions. The Copilot's VOR receiver was tuned to Colts Neck and his glide slope to LaGuardia. The Captain then transferred the information from the Copilot's side to his own instrument so that he could fly the proper radial to bring him to the LaGuardia ILS. Between Colts Neck and Flatbush, the Captain tuned his receiver to the LaGuardia ILS, identified it properly, but did not return the transfer switch to the original position. Hearing the correct identification he made the mistake of assuming that he was now flying the LaGuardia Localizer and glide slope and made his approach accordingly. Fortunately, he was picked up by radar in the vicinity of the field heading for the hangars when informed of his position.

Another airplane of the same company with a different crew went through the identical maneuver. However, this time it was VFR and the Captain was able to discover his error in short order. Needless to say, company procedure regarding the use of the transfer switch has been completely revised to permit transfer of information only in emergency. (F.S.I. Newsletter).

Requirements of Largest Airfleet Poorly Understood in Key Circles

Requirements of general aviation—which includes all flying with the exception of military and commercial transport—are poorly understood in the key circles where the future of this vital segment of aviation will be decided, Joseph T. Geuting, Jr., manager of the Utility Airplane Council of the Aircraft Industries Association, stated in a recent address.

Geuting told the 27th annual meeting of the Aircraft Distributors and Manufacturers Association in Asheville, N.C., that "no one would wish to willfully deny general aviation its proper place in the aviation facilities scene." (Aviation facilities

(Continued on page 44)

Skyways Round Table

(Continued from page 16)

had last year. We will have less next year." **Blanchard:** "Well, I know I've never made low-frequency approach here; it has always been ILS. However, you're talking in terms of minimum."

Robertson: "Considering the future, I think VOR equipment would be minimum. Eventually there will not be any low frequency ranges. Buying VOR now would be more economical than low-frequency equipment from the standpoint of future use. With less use for low frequency, your ADF can supplement low frequency needs, at least in this area."

Blanchard: "Which is worse: a fellow coming into this area with good equipment but who doesn't know how to use it, or a fellow who is really sharp with the minimum equipment?"

Robertson: "Well, I would say that experience, knowledge, and equipment are all certainly important."

Watson: "Well let's stick right to the VFR requirements until we can decide what should be the minimum for safety for that, Mr. Thayer, I think you're a recent purchaser of a light airplane, what would be your concern?"

Don O. Thayer (Don O. Thayer, Inc): "Four years ago, because of the necessity to travel throughout the United States, I decided that I would like to fly. I always had an interest in airplanes, but I had never had any instruction . . . never had even flown in small planes. I went out to an airport one day and saw what I thought was a nice airplane; when the salesman said 'I've got a sister ship to this one coming in that is used and it's got this radio equipment in it,' I purchased the airplane. They taught me to fly it."

"After thirty-five hours of solo, I got a license and my wife and I took out across the country. We made, I guess, about four round-trips to the West Coast during the first nine months I owned the plane. It was a Bonanza and had an ARC VHF transmitter and receiver in it. The transmitter had, I think, five or six channels and the receiver was tunable. It also had an RCA radio that was just audio for the low-frequency range. Well, in about nine months I found that was not sufficient for me. I had no knowledge of high-density areas. When I flew into New York, which I did quite often, my radio equipment was inadequate and I had trouble. As I say, I didn't have experience, and in addition, I didn't have the radio. I think the inexperienced pilots need more help. I know when I'd come up to a tower some place, even though they would be as nice as they could be to me, I generally would need more help than they were able to give me because of my limited radio equipment and limited knowledge. I'm not a professional pilot; I'm using this airplane for my own personal transportation."

"Now, in four years, I've had lots of opportunity to fly. I have a little over one-thousand hours now. I flew my first plane about 150 hours and then I decided I wanted more equipment. I didn't want to put it in the old plane, so I ordered a new plane. I had an auto-pilot, dual VHF receivers and transmitters, and an ADF put into it. I flew that plane for about eight or nine hundred hours over the period of four years, and I flew in these high-density areas. I'm still not

much of a pilot, I don't get in IFR conditions on purpose. Even so, you can't keep the conditions from here to Chicago VFR every day that you want to go. If you used your plane just on nice days, you wouldn't get anywhere near justifiable utilization out of it. Every time that I wanted to go some place I've always had to get "over-the-top," which I didn't like to do. I've had little experience in letting down through anything and I find that I'm not alone. I have five or six friends who also have airplanes and they fly the same way I do. Some of them haven't had the interest I've had to dig into the problem and find out, so when you are talking about minimum radio for a pilot, it's a lot less, as Mr. Blanchard brought up, than it is even for a person like me. Now in my new Cessna 310, I have lots more gadgets and I'm having a wonderful time learning to use them. I have dual omni, an automatic pilot with an approach coupler, a glide path, a marker receiver, an ADF, a thirty-six channel transmitter and a stand-by transmitter. Even with these I have trouble when I come to La Guardia in getting Approach Control, because I don't know the system. As you say, even if you have all the equipment, if you don't know how to use it, it is just as bad. To a certain extent, the necessary equipment is not the most important. It is the pilot, and when you are talking about salesmen or executives who fly their own planes, I think I represent the type of person that you have to aim for to a great extent."

"There either has to be better schooling, or higher requirements as to who can fly, especially in these areas—or it has to be attacked from another way. I think all of you would agree that this new plane of mine is fast, is well equipped and yet I know that I am a menace to a certain extent here, because I don't know how to use all the equipment. However I have an interest in increasing my knowledge and I intend to know how many fellows in my category are flying in here daily. Such pilots are flying more and more into the big cities such as Washington and New York. It's probably along these lines that we should aim our discussion; perhaps we should try to define these applications and then get radio and navigational equipment to fit the situation better, rather than saying, 'here's a minimum that one pilot needs, or what an airplane needs.' It all depends on the pilot."

Watson: "Mr. Thayer, in your first statement about your first airplane you mentioned you had ARC equipment and I assumed that was the five-channel type."

Thayer: "That was the five-channel transmitter and tunable VHF receiver."

Watson: "You found that you were a little short in radio. In what way? In your transmitting frequencies?"

Thayer: "I was probably short in that respect on navigational equipment. That particular transmitter gave me everything I needed for flying at that time. I fly only daytime VFR, but I think out of a thousand hours I probably have had seventy-five or eighty hours (and seventy-five or eighty too many) over the top or coming through, or getting on a little bit of instrument condition where I was just barely on the minimum and, as I say, I shouldn't have been there. But, I started out when it was nice; it might have gotten dark on me, or it may have gotten hazy coming into an area. But back to your question—probably it was more

navigational equipment that I needed most in my first airplane."

Watson: "Mrs. Renna. I think your operation is VFR and more varied. What are your thoughts on this problem?"

Mrs. John Renna (Doris Day Furs, Inc): "A good many of my thoughts have been touched upon by these gentlemen. I think they are perfectly right in emphasizing the personal variable, namely pilot ability and the educated use of the instruments they've got. We'd all love full instrumentation and an instrument rating, but the problem is, how good can you be when you don't fly instruments enough of the time?"

Watson: "We're just talking about VFR flying."

Renna: "I know, but when you get away from perfectly good VFR conditions and into marginal stuff, it's your own judgment that tells you when to make the one eighty, when not to go further into an area or condition that you can't handle. You're going to get into trouble with these new instruments unless you have the necessary training and practice, which is what most personal business pilots lack."

"I find that with a dependable VHF receiver and transmitter using 122.1 and 122.5, directional gyro and ADF, I have had sufficient instruments to fly thousands of cross-country hours. And added aid, though not essential, was an Omni receiver. ADF pays off under low ceiling and poor visibility conditions. Omni is worthless except with sufficient altitude, which is when you usually have good visibility."

"A good many of these hours were in the New York, Washington, Cleveland, Los Angeles, Dallas areas. I can't remember more than a dozen flights in a ten year period that were cancelled because of IFR conditions. Due to thorough training in contact flying, virtually all flights were made on schedule. More equipment is not the answer. Training and practice in pilotage, using a minimum of equipment, and staying out of such fields as LaGuardia and Washington National under marginal conditions is the answer to safe, schedule-keeping flights."

"It's a background of real piloting experience that Mr. Blanchard touched upon. I think that experience is more important than having the instruments. If you have them, being able to handle them is terribly important. Just old-fashioned training, which many personal business pilots these days are probably not going to have with the modern airplane solo-flight training, is very important. I think that in marginal conditions, if you don't have experience, if you can't rely on yourself more than on an abundance of gadgets, you're more than likely to get into trouble."

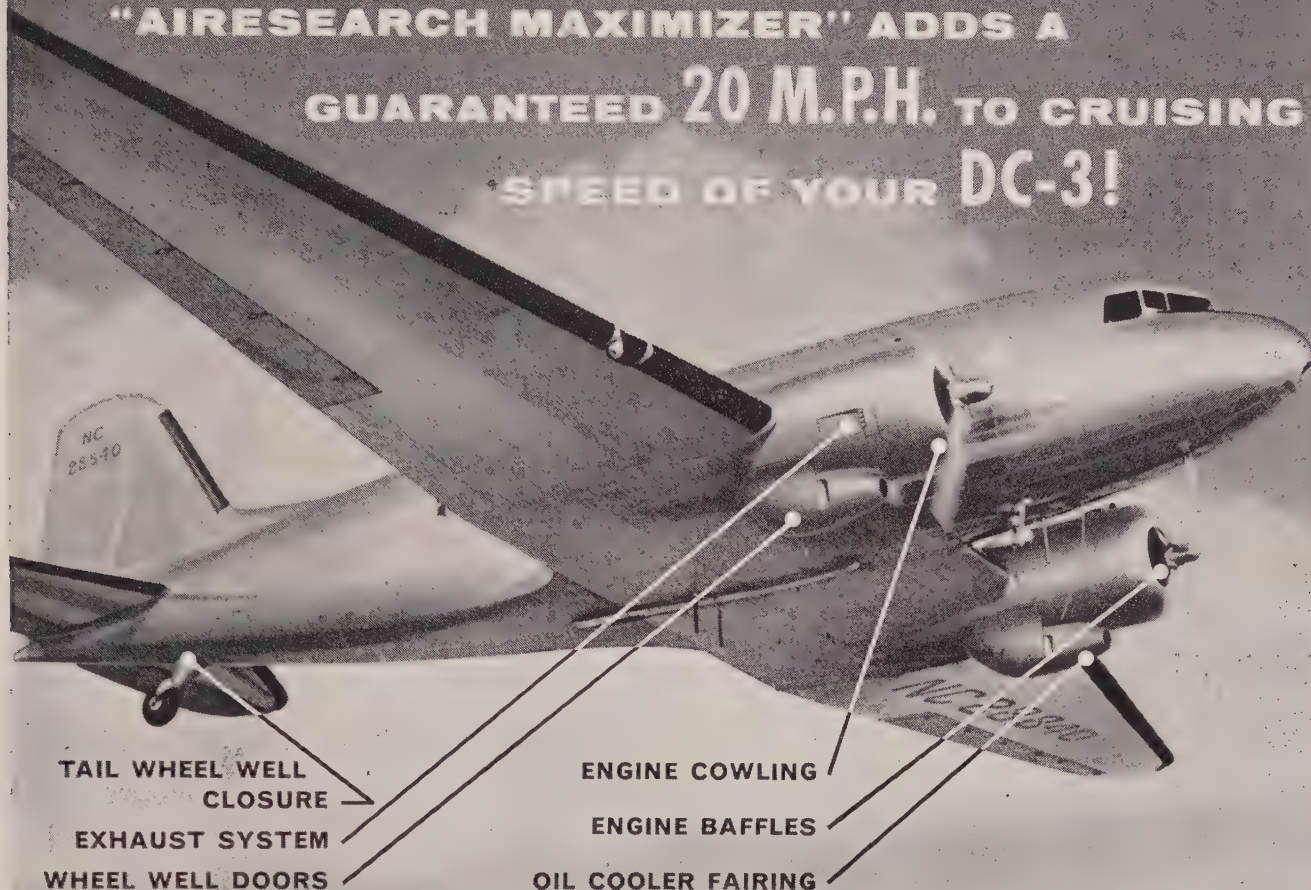
J. H. Sellers (Technical Supervisor, Aviation Dept., Insurance Company of North America): "I wonder if you would like an insurance company's viewpoint."

Watson: "Go right ahead. We are going to get to that."

Sellers: "Our position is very simple, and it's basically in agreement with everything that has been said so far. We don't think of ourselves as a police agency, although we do have a very comprehensive system of inspections, which we regard as a safety device to our insureds. We try to look over every one of our risks once a year, but we don't have any minimum standards for in-

(Continued on page 28)

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Skyways Round Table

(Continued from page 26)

strumentation, preferring to leave that to the CAA. What we look for, and examine very carefully, are the pilot qualifications. Past experience indicates that basic factors in whether or not we accept a risk, are not so much the equipment of the airplane, but who flies it and whether he knows his limitations and those of his aircraft as equipped. Also very important is his general attitude toward these problems. That's what we try to find out during our annual survey of the risk."

Ronald Bamber, (Vice President, Stamford Engineering Works): "I think the part which was brought out about multi-channels is quite important. You should have at least eight crystals on your transmitter, as well as an omni-receiver, and perhaps dual transmitters.

"We should have smaller crystal-controlled receivers. I don't think there are any on the market today, although there are thirty-six-channel, crystal controlled units. I think it's quite necessary for manufacturers to offer equipment which is less costly but equally dependable."

Watson: "You feel that you need this equipment for VFR operations?"

Bamber: "I definitely think so."

Leo Marshall (Airways Operations Specialist, CAA International Airport, Philadelphia): "We think there is one thing necessary, just for the record, namely that a two way radio is just as essential to the light plane operating into a Terminal Airport, as a telephone is to the modern housewife. The reliability of the radio is of course extremely important, but adequate power of the transmitter cannot be over-emphasized.

"It must be a good transmitter and it must be operating at all times. The one big drawback in the ADF is the effect of thunderstorm activity. There are any number of times when pilots approach with a thunderstorm moving in on us, and it is vital to direct and hold the aircraft to a safe position where we know the storm is not threatening. Radar, Pilots Reports, and other information, enable us to use this procedure. We want to talk to this man and we must give him precise instructions as to just what we want him to do, and when to do it.

"The ADF won't always work with a good thunderstorm booming around you, so that brings us back to the Omni. We think that a reliable Omni receiver and a reliable tunable VHF communications receiver is extremely important.

"We have several Omni stations around Philadelphia. There is Woodstown, Pottstown, (to be commissioned shortly), and Westchester. For example, if our visibility is restricted to less than VFR minimum, and it is necessary to instruct the aircraft to hold Woodstown, it is comforting to know that he is actually holding Woodstown and is not moving around aimlessly, impeding traffic or generally creating a hazard.

"So we think that the basic equipment I mentioned is necessary. We think that the tunable receiver, today, as a crank type, does not provide adequate speed in fine tuning. In order to tune up a tower frequency of, say, 118.5 mcs, a man must have his head down in the cockpit in order to select his frequency. As the dial needle approaches 118 he hears the word 'Philadelphia' and decides this is sufficient, but he is listening to

'Philadelphia Departure' control on 118.1 instead of 'Philadelphia Tower' on 118.5. The tower calls and calls, the pilot calls and calls, slowly becoming indignant because he hears Philadelphia and is getting no reply. Of course, he is listening to a different position; in our case the man is five floors below the tower and talking to ten or fifteen aircraft departing from Philadelphia on IFR flight plan. By the time the pilot gets the idea that he is listening to the wrong frequency it is necessary for the Departure Controller to leave what he is doing and broadcast blind, asking that the aircraft please tune to 118.5; so back the man's head goes into the cockpit for another bout with the receiver.

"Our pilot gets on the ground and the same sequence of events takes place. The Tower tells him to make the next right turn and listen to Ground Control at 121.9 ms. He starts tuning 121.9 trying to find the next right (at night it's doubly difficult). Finally he again hears Philadelphia, but this time it's Philadelphia Approach Control on 121.7, who is talking at about 180 words a minute to aircraft moving in on Philadelphia. He doesn't hear this ship on 121.9; it's the Ground Controller's function to monitor these frequencies, 122.5 or 121.9.

"The poor Ground Controller upstairs is trying to get the aircraft away from the heavy duty runway and moving up the taxiway, in order that succeeding aircraft may move in, thereby keeping the runway continually available. We don't say that it's the pilot's fault; his tunable equipment is not adequate to meet these traffic requisites, and at night the problem becomes even more critical.

"We can be of great service to the pilot, particularly with our Radar. Take, for example, the man coming into the control zone, below basic VFR minimum, with a clear ceiling but with visibility at one mile. Coming in on top of the smoke, he's got to have some kind of separation. The law requires that we provide standard IFR separation in one form or another. New methods adopted provide for fitting him in with the rest of the traffic on the Radar scope. He doesn't have to be an instrument pilot to do this, but we want some precision with respect to headings. 'Turn right heading 320, Turn left heading 285,' 'Maintain VFR until further advised' or 'One thousand on top of smoke until further advised.' He is still technically VFR, but he is being coordinated with the rest of the traffic. We feel that the ordinary wet compass is not sufficient for the light plane pilot in this instance. A directional gyro is a must. Therefore a man needs three things: good radio, gyro, and an Omni receiver."

Watson: "Mr. Karant, you look as though you would like to say something on this subject."

Karant: "I've been going through this kind of an operation for five years or more. I'm afraid that once again we are falling for the old business of talking and thinking like professionals, or millionaires, or both.

"The majority of these men are using small aircraft and they are lucky to be able to afford the minimum desirable equipment. This kind of conversation comes from the 'Money Is No Object' section of aviation.

"We have tunable receivers only because the market demands that they be in that price category. If any of us could afford crystal-controlled equipment, I'm sure we

would all have it, but the price and the weight are fantastic when compared with the others. You can buy a complete omni installation with four transmitting channels for \$500.00. You've heard several here agree that we ought to have an ADF. Do you know how much an ADF costs today? It costs about \$600.00 more than the complete omni in my plane, which has an eight-channel VHF transmitter with complete communication receiver, 75 megacycle marker receiver and a localizer receiver. An ADF does nothing but point.

"The problem we are having in New York is the system. It's so complicated today that even if I had an instrument rating, I would never come into New York on instruments by myself.

"I have a Bonanza and I can't carry any more electrical equipment. It makes me wince to listen to airline people heave a sigh of relief when they announce the they have now junked 50-channel equipment. You mustn't raise your sights any higher than that if you are going to talk about minimum equipment."

Raymond: "We assume that everybody else knows our business because we know it so well. I've talked to a gentleman with a 310. We have about the same amount of flying time and he has had trouble with all his equipment, for the same reason I have had trouble. The reason is that our equipment is too complex for our brain to keep up with it. At altitudes where oxygen concentration is less, our brain isn't hitting so well.

"Another item I think can be solved is crystal control. I've worked out a little system with a small transmitter that Aerotron puts out, whereby in one power pack, I have a transmitter with a number of channels. All I do is just push down my button when I have say, 118.1. When I get a whistle on my receiver I know it's on 118.1. It helps and you don't have to buy a crystal-controlled receiver.

"The other reason we have trouble changing from 118.1 to 118.5 may be because the guy who is flying up there is a little fatigued and he may have been in some bad weather and he can't click so well. They know the tower operators are pretty good and that they help along."

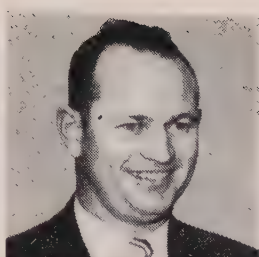
Watson: "I don't think we have heard yet from Mr. Crawford of Aviation Underwriters Group on this question."

W. D. Crawford (Field Representative, Associated Aviation Underwriters): "I do a couple of hundred hours flying a year for my company throughout the Northeast, using a single-engine aircraft strictly on a VFR basis. I'm the poor variety of pilot using an airplane for transportation. I feel that in my own case I want two basic things for cross country flying: first of all, Omni; and secondly, a gyro compass to fly headings. A wet compass is not nearly accurate enough. I have the small Omni set that Mr. Karant mentioned, which gives me Omni and tunable VHF reception and four frequencies of transmission. I have no occasion to come into New York; I am based at Morristown, New Jersey, and I go into Boston, Buffalo, and other heavy traffic areas. I have found that under VFR conditions, often marginal, by using Omni, calling in well in advance, filing flight plans, and giving specific locations as soon as within range, that the tower has been able to work me into the pattern very quickly

(Continued on page 30)



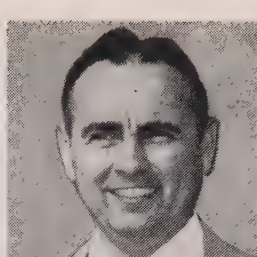
Don Vest Vest Aircraft & Finance Co., P. O. Box 5306, Sky Ranch Airport Denver, Colorado



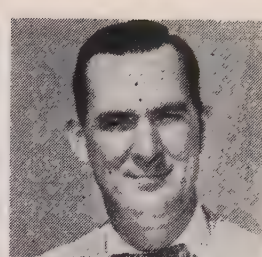
Gene Hudman, Stonnell and Holladay Aircraft Sales, Carolina Division, Municipal Airport, Charlotte, North Carolina



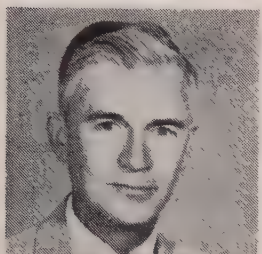
Peter Graves Southern Ohio Aviation Sales Co., Dayton Municipal Airport, Vandalia, Ohio



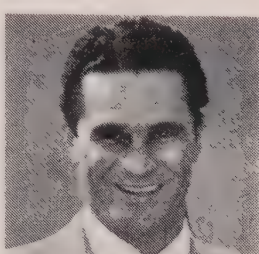
John Wilsdon, Hunter Aviation Co., P. O. Box 122, Lambert Field, St. Louis, Missouri



Victor 'Vic' Bruce, Indianapolis Executive Aircraft Corp., Indianapolis Municipal Airport, Indianapolis, Indiana



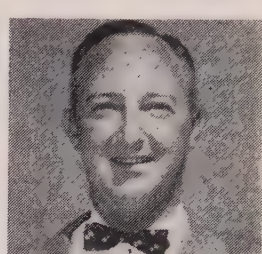
H. Warren Holladay, Stonnell and Holladay, 843 Washington Building, Arlington Towers, Arlington, Virginia



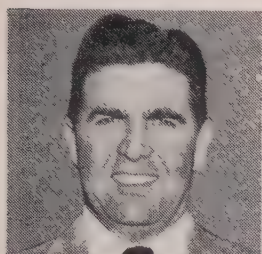
Norman Hoffman, West Texas Flying Service, Midland Airport, Box 82, Midland, Texas.



Art Meurer, Arthur Meurer Co., Inc., LaGuardia Field, New York, N. Y.



John S. Brown, Brown Aero Corp., 3300 Love Field Drive, Dallas, Texas.



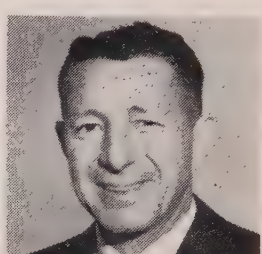
Robert F. Wood, Newport Air Park, Newport Rhode Island



H. Leisbee Wheeler, Buffalo Aeronautical Corporation, Buffalo Municipal Airport, Buffalo, New York.



A. M. 'Sime' Bertolet, Reading Aviation Service, Inc., Municipal Airport, Reading, Pennsylvania.



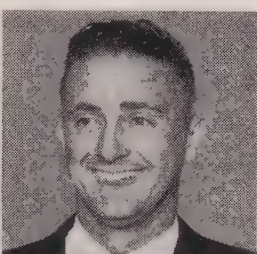
Max R. Brand, Aero Commander Dist. (Downtown Airport), Hangar 3, Municipal Airport, Tulsa, Oklahoma



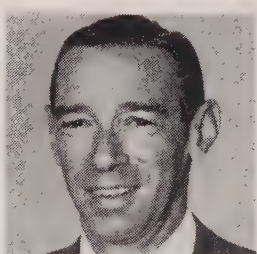
E. H. 'Ted' Tolan, National Aero Sales Corp., Midway Airport, Chicago, Illinois



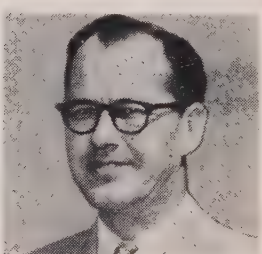
Dale Ropp, Jr., Aero Southern Corp., 601 Broadway, Nashville, Tennessee.



W. H. 'Bill' Buchanan, Sales Manager, Johnson Air Interests, Inc., Horlick-Racine Airport, Racine, Wisconsin.



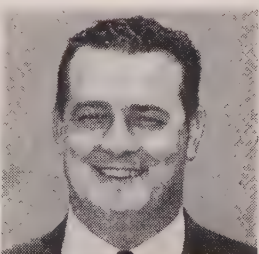
Louis Humphreville, Executive Aircraft Corporation, Municipal Airport, Pontiac, Michigan



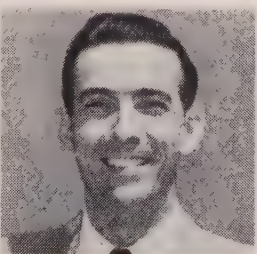
L. S. McIntire, Vest-Livingston Aircraft, Inc., International Terminal Building, International Airport, Oakland, California.



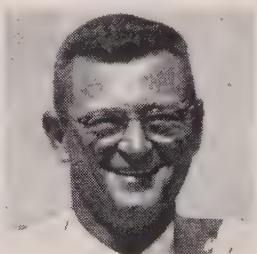
John A. 'Jack' Bauman, Santa Monica Aviation, 3011 Airport Avenue, Municipal Airport, Santa Monica, California.



Herrol Bellomy, L. B. Smith Aircraft Corp., Miami International Airport, Miami, Florida.



Lucien M. Taillac, Trans-Aire Corporation, Pan-Air Building, New Orleans Airport, New Orleans, Louisiana.



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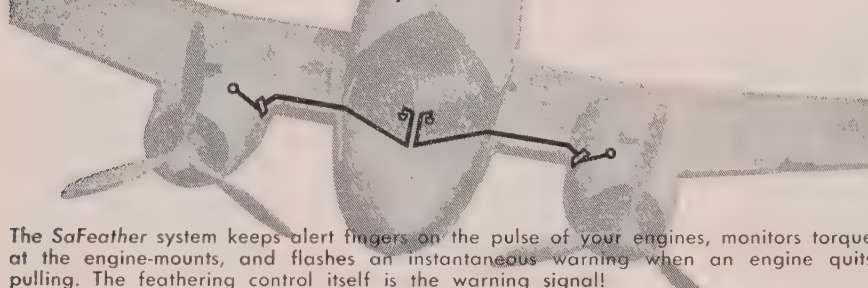
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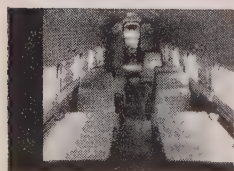
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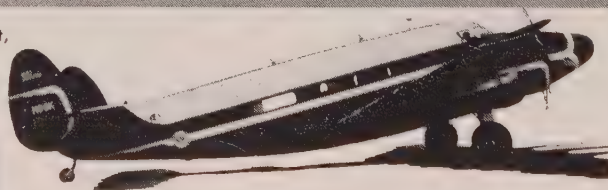
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Skyways Round Table

(Continued from page 28)

and very easily. I do have a low frequency receiver and high frequency transmitter which were in my plane when I purchased it, giving me a stand-by system. I would not have purchased this set outright, but would consider one of the portables giving LF reception and VHF transmission.

"From the company standpoint, I am particularly interested in the underwriting of hull and liability insurance on the various types of single and multi-engine aircraft. When we are approached for insurance, we look into the risk as thoroughly as we can, particularly in regard to the pilot. If it is an inexperienced man who has decided to buy an airplane such as a Bonanza, which is a relatively hot single-engine craft, and if it is fully equipped with dual Omni, ADF, autopilot and what have you, it appears to us that here is a man who is apt to get himself in trouble, because he has more equipment than he knows how to use or will know how to use in a number of years. He tells us that he is going to fly strictly VFR, but we all know that if he is to get cross-country utility out of his machine, he is going to fly marginal VFR or IFR soon. Whether or not he will disregard utility and stay on the ground, or make the famous 180 in time, until he becomes qualified, is the problem. A lot of equipment is apt to be a temptation to the inexperienced. New purchasers of aircraft should be encouraged and helped as much as possible in cross country and instrument flying. An instrument rating is cheap life insurance.

"I'd like to ask Mr. Marshall a question. One of the problems you raised was in regard to tuning VHF receivers. I know that on mine, for example, the indicator is off a couple of tenths and I suppose it is on all of them. Couldn't you interject the word 'Tower' or the word 'Approach' or the word 'Ground,' every minute or so?"

Marshall: "The regulations call for identification on initial call-up between aircraft and control towers, but it is coming in at about 180 words a minute, so one has to be pretty quick to hear it.

"As the Doctor says, which is very interesting to me, a man's mental process can change from altitude effect, which I didn't realize; but I guess it has happened to me at various times."

Raymond: "Well, I think everyone in this room has climbed up through an overcast in a nice big hole, and gone up fast to get over the top. You feel strange when you get up about 8000 to 9000 feet in a hurry. It's just because you're adjusting."

Schrager: "After listening to Mr. Thayer and Mrs. Renna, it appears that, in addition to all the expensive equipment that we find controversial, one of the cheapest things of all which is important, is a Flight Information Manual."

Thayer: "I look over one all the time, but I can't find any procedures in there that tell me how I should call over New Rochelle when coming into La Guardia, and so forth. I've just got my multi-engine rating and intend to get an instrument rating. But I wonder how I lived through these last four years with the knowledge I had.

"I'm a 'gadgeteer.' I know quite well all the gadgets on my plane. But I don't know when and where to operate them. I know

how the glide path operates, I know how the approach coupler operates but I hope I never have to get on it."

Ranley: "My plane has too much equipment for the generators. After we installed all our equipment our generators and electrical system burned out. We were over-equipped. I couldn't understand how two 50-amp generators could cost so much. An electrical engineer explained to me the difference between the two generators that cost \$2300 and the type that cost in the vicinity of \$75 on an exchange basis.

"I'm so happy that these two 50-amp generators—one on each engine—will carry my complete system in the event that one engine goes out. This carbon-type regulator is wonderful."

Louis Achitoff (Assistant to the President, Flight Safety, Inc.): "We've had a good cross-section of opinion here regarding the VFR problem. In the case of the IFR problem, I wish I had a specific answer. The requirements for IFR operations must vary with the locality in which you're conducting the operation. There are airways in the United States where you can get by with much less equipment than you can in the metropolitan New York area. In more congested areas with more complex traffic control, I think it's apparent that to do the same job more efficiently, you need more equipment. Let's consider the matter of minimums. We know that the ILS minimums are lower than the low-frequency minimums. If you want to shoot ILS minimums, then you need ILS. If you come to La Guardia, with weather at ILS minimums, and you only have a low-frequency receiver, then you can't use the field. *You're pressed with the problem of going to an alternate, or determining that before you even get here.* Then there's the communications problem coming into La Guardia. You must have the proper frequencies. We are gradually running out of frequencies in the United States. In order to accommodate all the different facilities in this country, and all the adjacent terminal areas where you have frequencies very close to each other, there appears to be no question that some time in the future we'll have to have more channels.

"Now what about reliability of equipment. We can talk about receivers and transmitters and ADF's. But we must also consider their quality. I believe that it's being proposed by the CAA that all equipment will be TSO'd. Right now there's a big variation in equipment. In addition, you sometimes have a situation where you have such a multiplicity of receivers and navigation equipment, that it practically requires a secretary to tell you which radio you're using.

"It would appear that you have to have the type of equipment that will enable you to report over fixes accurately, for it is important that separations from other aircraft and proper timing be maintained.

"Another problem is how much can you put into an airplane. You can't overload the airplane to the point where the pilot can't accommodate his passengers or he can't carry enough fuel to get himself to his destination.

"How preferential routings are set up and what kind of a system is developed for the handling of IFR traffic will largely determine the kind and amount of equipment needed. If a system, routings and fixes are established that will require a certain type of communi-

cation equipment, that's what the minimum is going to be.

"Perhaps we can get Mr. Robertson's approach on that."

Robertson: "The practical requirements for IFR flying consist of equipment adequate for navigating and holding on VOR airways; for holding at radio beacons; for making approaches and adequate VHF equipment for direct pilot/controller communications.

"The latter is a feature which is required as far as en route traffic control in this area is concerned. The need for pilot/controller communications is far greater in high density terminal areas where the elimination of the middle-man delay becomes a necessity."

Marshall: "As far as equipment needs are concerned, Radar, as it is commissioned throughout the country, will reduce the navigational work-load tremendously. Many of you here have flown into areas where you get complete radar handling from the time you reach the Outer Fix until you are vectored into the final course. You're given a heading to leave the fix, then a vector to follow preceding aircraft into the field.

"You'll find that the navigation work-load is being reduced with respect to equipment also. The man who departs from Philadelphia bound for Pittsburgh finds that the departure route is hardly feasible without both VOR and low frequency equipment. However, a Radar Controller *can* take him, we'll say, to Lansdale by vector, without the use of low frequency or ADF. Here is a typical example where reduction in equipment will come about.

"We have found that, almost without exception, every business pilot that comes in IFR, either single or multi-engine, is equipped to fly on instruments and to talk to us on any frequency. Very rarely do we have any trouble with these people, and we rarely experience any delay due to lack of equipment. Perhaps there is sufficient equipment in the aircraft we are flying today strictly on ILS or VOR.

"As we adopt a complete radar system, we are going to find that the need of tuning ADF's and bracketing range legs will become unnecessary. We'll put you on course for the Range Station, we'll turn you onto Final Approach three miles west of the Outer Marker, and there you are. You sit right on the course, catch the Glide Path another three miles ahead, you're over the Outer Marker, and you've got it made. So, we have a lot of hope for radar.

"We'd like more coverage on radar, and very important, we'd like light radar beacons so that light planes can be more readily discerned on the radar scope. It's difficult to pick up a single-prop plane at extreme ranges. I think this particular type of radar beacon will be *supplanting* some of this navigational equipment."

Achitoff: "Lee, aren't you in effect saying that whereas we may get away from certain types of navigational instrumentation, we're not doing so in the realm of communications? In other words the man who you're going to vector out to nine thousand must have a good standby receiver. So we replace one type of receiver with another type of receiver. I'm wondering whether, in the long run, we are leading up to more equipment and more complexity again, because we still will have to have our present equipment, and we're going

(Continued on page 32)

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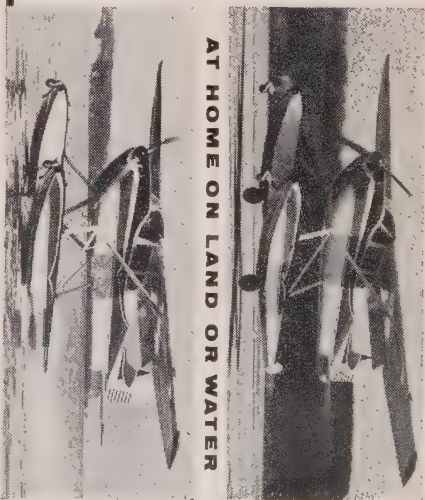
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to have to have a pretty good communication system as a standby if the pilot is going to rely upon radar control."

Marshall: "Possibly the manufacturers have on the design boards a type of equipment that will help you people and help us too. It certainly seems to me that they should have multi type equipment, which is going to do all the jobs for Radar, Enroute, Navigation and Communication.

"I think that the type of receiver that the Doctor speaks of is very good; we use a similar system in our Control Tower, called a Spot Signal Generator. We merely kick in the frequency and home our receiver right to it."

Raymond: "That's not special equipment. We utilize what we have."

Marshall: "Actually if strictly necessary we could take you in or out of Philadelphia with nothing but a Low Frequency Receiver. CAA requires that you have minimum equipment to fly IFR. I'm not familiar with all the specifics on 'radar vectoring,' and I hesitate to comment on it, but I do know that radar receives practically all targets within thirty-mile ranges. It depends of course on how good radar is at the altitude. You can't see an airplane twenty miles out at a thousand feet where many light planes might have to fly."

Bamber: "I think it's equally important for the pilot to know exactly where he is, as to have the controller know where he is."

Watson: "It's really nice to know where you are, but there's not much you can do about it if you're the only one who knows where you are."

"But remember we're trying to help the business man get more safe utilization out of his airplane. What equipment should he carry to do this? What about de-icing equipment?"

Blanchard: "Concerning lighter executive aircraft, I think continued flying in ice is not advisable. We do utilize our airplanes in the winter time considerably; but as a rule, we stay away from sustained icing conditions. I think if you set a limitation to what you were going to do with the airplane, as long as you didn't subject your airplane to continuous icing weather, you could get by with propeller slinger rings. If you were going up through it or coming down through it you would have a certain margin of safety as long as you can keep your props clear."

Watson: "Doc, do you have any comment on that? You might have been in a little ice over the past few months."

Raymond: "As far as ice is concerned, I don't go anywhere near where I think there's going to be any."

Thayer: "I try to do that too, but I find, going cross-country in my airplane, using it continually for transportation, that I want to be protected. I've got boots on my plane and alcohol de-icing. I've never had to use them. I'm a VFR pilot, but I don't think there is such a thing as a real VFR condition."

Raymond: "That's the point. Seems like we ought to have a little more improvement on our weather reporting. I'll give you a good example. I was moving out toward Wheeling one day, and everything was pretty nice. All of a sudden the weather started to change. They were all giving me six thousand feet over the mountains and Pittsburgh, and I knew it couldn't be because the barometer was dropping pretty fast. I kept calling ahead, asking for any specials. I asked them

all kinds of things trying to get weather that was accurate. Most of those fellows don't even look out the window! They said six thousand feet, Pittsburgh, and here I was hanging in a fog, so I just sat down about seventy miles from my destination.

"It was lucky I did, because just ten minutes later, the airlines with their ILS approach couldn't make it. I think a little equipment should go to our weather bureau, so they can give us more special reports."

Watson: "I believe you're absolutely right; also a little more pilot reporting on conditions that they find en route would certainly be a big help. One other item that I'd like to bring up, is the effectiveness of rain repellents. Has anyone used them and if so what has been their value?"

Schrager: "If you are referring to FC-10 for the windshield, I use it now, and find that it's very good. You treat half of the windshield with FC-10 and leave the other half clear. On the bare side you don't have much visibility because of the rain, but on the treated side you can usually see very well. That's been my experience with it. The manufacturer's instructions say that conditions are likely to vary and it is recommended that one half of the windshield be left untreated. Then you can use either half, whichever is the clearest."

Nogard: "I'd like to make a comment on the matter of instrument flying. The CAA is in a position to set a minimum standard. If a pilot has a marker beacon or receiver or some other radio aid on his airplane, but does not take the time and effort to learn how to use it, we cannot take him by the hand and insist that he learn. How proficient a pilot becomes, according to our minimum standards, is the pilot's own responsibility."

Blanchard: "But now you're talking about minimum equipment. Coming into the New York area minimum equipment is a VOR, marker beacon, ADF, and low frequency, and so forth. I would think that a man's rating ought to restrict him from coming into high-density areas, or else he should be required to receive sufficient training in methods practised in such areas. I should like to add that I think, in general, ATC and APPC do a fine job of controlling, both area and en route, with the equipment they have to work with. Seconds and minutes of delay in the air are magnified into frayed nerves and quick tempers at times, but in most cases are brought about by our fellow pilots ahead of us in the approach patterns."

Nogard: "A pilot ought to be able to think for himself. It would be a hazardous operation for a man to attempt to come in with nothing but a low frequency receiver. I would say that 99 pilots out of 100 would have sufficient equipment before they would attempt making an approach in a high density area."

Watson: "This has been an interesting discussion on the difficult question of what minimum equipment is necessary for the safe and efficient use of a business pilot's aircraft. It has been a difficult question because, as we have here learned, there are many variables in selection of equipment to meet various purposes, as well as in the human factor, and the aircraft. Radio-wise, we seem to have agreed that a good, working Omni is the first 'must,' followed by a low-
(Continued on page 37)

PLANE FAX

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Flying sportsmen into Idaho's big-game paradise, Tom Kiiskila covers the 90 miles to the rugged Selway Primitive Area in less than an hour after takeoff from his home port of Orofino. He drops into narrow canyons to unload his passengers, then airlifts other hunters and their heavy game back to civilization.

"Almost all my flying is over rough timber country," says Mr. Kiiskila. "We make game counts from the air, check timber for disease, and fly right at tree-top level when we have to lead fire fighters to a fire. One big problem is high

head temperatures in our kind of flying. But even climbing out of a canyon where the air is really hot and dead, Chevron Aviation Gasoline 80/87 gives full power without knocking. It never fouls plugs, either; with Chevron 80/87 I never clean them between 100-hour checks.

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Minimum-Time Track Construction

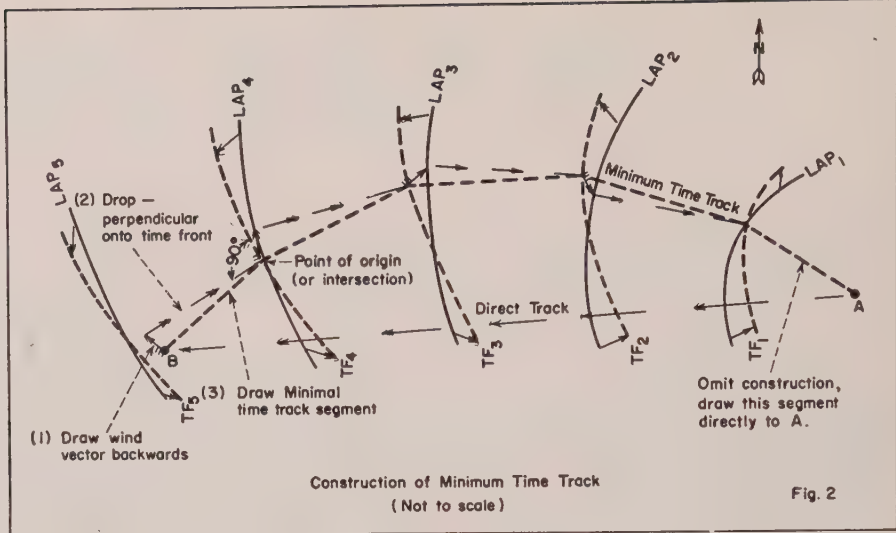
(Continued from page 13)

on figure 1.) The aircraft will cross this time-front, after one hour's flight, at a point controlled by the initial true heading.

A second air-position line is next constructed *parallel* to the first time-front, by placing the Weems plotter *perpendicularly* across the front, sliding it along the arc of the front, and establishing a series of points at a distance equivalent to the level flight true airspeed. These points are faired to form the calm-air arc for the second hour. The average winds existing in the area between the previous time-front and this second air-position line are then vectorially applied to equally spaced points, and the second-hour time-front constructed as before. This construction process is repeated for subsequent hourly intervals until the last time-front has been projected beyond the destination. The time-front, for each one-hour period, is thus vectorially added to previous time fronts. Use of color lessens the possibility of mistaking an air-position line for a time-front during the construction process. Where two different winds effect the aircraft over a one-hour period, they should be averaged into a single vector. Where wind force and direction are light and variable in certain areas, the time front should be drawn immediately behind the air-position line without measurement. This procedure creates a time-front favoring a track of least distance, which is preferable to one which tends to increase distance on the basis of questionable wind vectors.

Perpendicular application of the true heading vectors to the previous time-front expands subsequent time-fronts outwards at the maximum possible distance from the departure point. Flight headings must adhere to this perpendicular principle in order to achieve that desired result. (Diagonal flight between time-fronts results in falling short of the maximum possible distance.) A time-front constructed in this manner, for the given conditions of airspeed, wind, and time, is a *locus of maximum flight distance*, that distance being achieved through a system of heading control. A track of maximum flight-distance in a given time, is synonymous with a track of least flight time for that same distance. A minimum-time track may then be defined as that track, passing through departure point and destination, whose associated true headings are perpendicular to each previous time front. The various possible positions along a given time-front are achieved by alteration of the initial true heading to the first time front; all headings thereafter being rigidly controlled by the curvature of succeeding fronts. The aircraft can be at any position along TF_4 at the end of four hours, depending on the initial heading. Inspection of the distances, from various points along TF_4 to the destination, readily discloses the most advantageous position, after four hours' flight, to be north of the direct track. In order to explain the solution for the minimum-time track, it is necessary to view the problem in reverse; from destination backwards towards the departure point.

All minimum-time tracks to different des-



tinations within the wind field must lead back to the departure point, due to the decreasing radius of curvature of the time fronts near the departure point, which converges the previously-defined headings to this common point. Determination of the minimum-time track is then reduced to selection of the track which passes through the destination. This is accomplished by a reverse vectorial solution, as illustrated by figure 2.

Where the forecast position is known, the existing wind vector, and a defined true-heading vector, may be applied in reverse to locate an unknown point of origin. The desired true-heading vector is known to intersect TF_4 at an angle perpendicular to the arc of the front (or at 90° to a line tangent to the arc of the front.) It is further defined as the shortest-possible true-heading vector towards TF_4 : the shortest vector indicating least-time. These facts are applied to the sample problem by plotting the wind vector backwards, or upwind from the departure point, and positioning the Weems plotter between the upwind end of the wind arrow and TF_4 , so that the black line scribed across the end of the plotter is tangent to the arc of the front, and the distance from the upwind end of the wind arrow to the front, is at a minimum. A line drawn between this point of intersection at the time-front, and the destination, is the last segment of the minimum-time track. Where the destination lies between two time fronts, the wind force must be interpolated proportionate to the flight time for this last segment. The point of intersection on TF_3 is determined by working from the point previously located on TF_4 , and the process repeated across the various time fronts to the departure point. Upon completion, the track may be modified slightly to overhead any convenient radio facilities, and transferred to the desired navigational map for VFR flight purposes. Headings used in construction may be disregarded. Where IFR conditions are anticipated, the flight should be routed over the most nearly-coincident civil airway.

The construction of a minimum-time track by use of a plotted wind-field requires approximately one hour, and for this reason the technique is recommended only under conditions likely to produce good re-

sults. Where a number of pilots operate from the same airport, and can share the work involved, a pressure-pattern planning-board, constructed daily with a complete wind field is a worthwhile project. Moderate changes in true airspeed (15%) will not appreciably alter the location of the track, enabling the time-fronts to be utilized for several different type aircraft. Once the time-fronts are constructed, determination of the proper track to any destination within the wind field is a matter of several minutes. In order to be omnidirectional, time-fronts drawn through a complete wind field around a midwestern point, will form concentric, circular patterns.

Pressure-pattern techniques were adopted by the domestic airlines to reduce operating expense, and improve service. The possible reduction in operating expense for a business aircraft operation is in proportion to the number of flights which exceed 700 N.M. in length, and a specific statement on monetary savings would be difficult to make. Executive man-hour values far exceed the aircraft operational expense, and the increase in operating efficiency is more than ample incentive for the adoption of this technique. Flight time reductions of 15% or :55 on a six hour flight are quite common. A great deal of personal pleasure is also experienced from outwitting the elements in an effort to make executive flying the safest and fastest form of modern transportation.

Check your calendar!

- N. B. A. A.
- Ninth Annual Forum
- Miami, Florida
- October 23, 24, 25

Round Table

(Continued from page 32)

frequency ADF and an easily, accurately tuned extra VHF communications radio, in that order. On the panel, a Directional Gyro seems minimum for both airways and terminal flying, with an altitude instrument next. Although auto-pilots and additional fuel capacity did not appear sufficiently urgent to warrant mention, their common usage suggests their value. Obviously, weight and power drain considerations are individually binding in every case, according to the type of operation the business owner pilot plans.

"I want to thank all of you on behalf of SKYWAYS for your splendid cooperation in attending this Round Table meeting, and in contributing your valuable thoughts on this topic, which is important not only to us present but to all who fly for business transportation."

As befits any publication devoted, as SKYWAYS is, to the proposition of serving an important segment of the public, principally the non-subsidized corporate, executive, business and just plain working aircraft operators and pilots, we recognize the diversion of interests in this wide ranging category. Also, the inevitable difference between the equipment and pilot capabilities of the professional airline-type crews and the personal pilot using an airplane in the furtherance of his business.

We do believe, however, that there is a definite relationship between the post-war growth of personal business flying and the development of aircraft, equipment and techniques that make this kind of aviation easier, safer and more practicable. It is obvious that use of the aircraft as a practical business tool is tied irrevocably to its ability to cope with the problems of navigation, distance, terrain and the weather.

Given the natural limitations of good judgement and sound application of proven techniques, the modern personal business aircraft and associated available equipment is designed to provide that increasing utility that has sparked this fastest growing segment of American aviation.

As we watch the struggles of this ever more challenging market for airplane and equipment designers, we can only say that we hope the business man on wings will never be satisfied until the partnership of his equipment and his practiced ability to use it achieves a standard of safety and utility closely approximate to that of the airlines.

We do agree with the conclusion of the Round Table published herewith that a business pilot who will not match this advanced equipment with comparable ability will live longer adhering to the practices of his diminishing brethren, the fair-weather "pleasure pilot."

The Editor

now hear this . . .

(Continued from page 6)

mercial aircraft products to Beech dealers showed an increase of over 26% over the previous fiscal year.

Benrus Watch Co. proposes to enter into the instruments field with the purchase of PIC Design Corp., Lynbrook, N.Y.

The Garrett Corp. Airsupply Div., Beverly Hills, Cal., has announced the opening of a new branch office at Denver, Colo., headed by Mel Kalb.

Southwest Airmotive Co., Kansas City Branch, has been appointed distributor for Eclipse-Pioneer Div., Bendix Aviation Corp. The new distributorship of Eclipse instrumentation and automatic flight systems includes Missouri, Kansas and northern Oklahoma.

AERO CALENDAR

Aug. 6-8—National West Coast Meeting, SAE, Mark Hopkins Hotel, San Francisco.

Aug. 15-17—National Turbine-powered Air Transportation Meeting, IAS, Grant Hotel, San Diego.

Aug. 21-24—Western Electronics Show and Convention, Sponsored by IRE and the West Coast Electronics Mfrs. Assn., Pan Pacific Auditorium, Los Angeles.

Aug. 22-24—Bendix Scintilla International Ignition Conference, Sidney, N.Y.

Sept. 1-2—Third Annual Jim Long Memorial Trophy Race, sponsored by Pomona Valley Pilots Association. Starting from Brackett Field, La Verne, Cal.

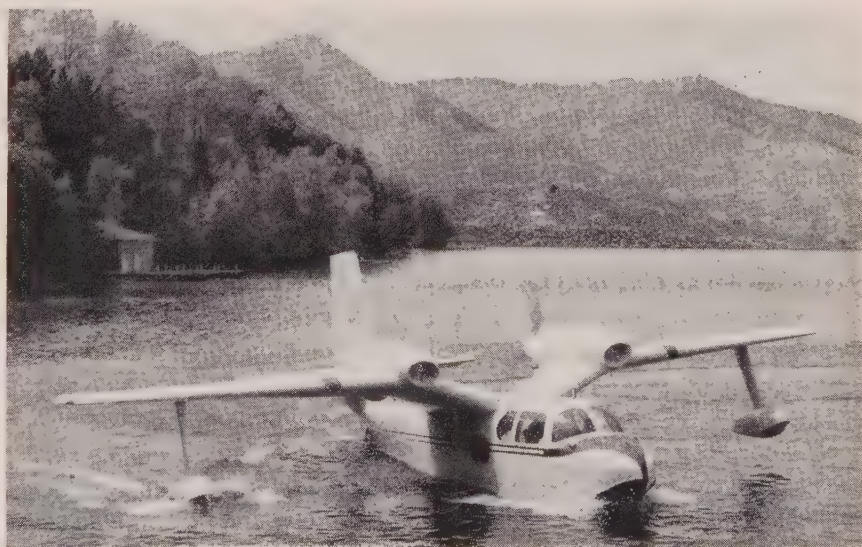
Sept. 9-11—International Northwest Aviation Council, 20th annual convention, at Boise, Idaho.

Royal AMPHIBIAN NEWS



Notes on America's outstanding utility amphibian for business flying and charter service operation

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Skyways for Business (Continued from page 19)

General Halstead AMVET Award Winner

Boston, Mass. General Lyle "Slim" Halstead, Chief of staff of the Massachusetts Air National Guard and a pioneer in executive aviation, received the 1956 AMVETS Aviation Award at the Governor's luncheon to National Commander Rudolph Pesata on April 21.

The award was presented for Halstead's contributions in promoting aviation interest. A flier for more than 35 years, has had a long and active military career. He is still active, serving as pilot for Fitchburg Paper Co.'s Grumman amphibian.

H. T. Thalman Seeking Facilities To Produce Midwing T-4

Harry T. Thalman is looking for financing and manufacturing facilities in the midwest for his Thalman Midwing T-4 plane.

Featuring a tear-drop fuselage, bubble-windshield that extends all the way to the propeller, and retractable landing gear, the 4-place all-wood airplane is powered by a 135-hp Lycoming engine and reportedly attains 170 mph. With a 40-gallon fuel capacity, Thalman said it has a range of 850 miles, or 1000 miles at economy settings.

The plane has a span of 40 ft., length of 21.5 ft., height 5 ft. 10 in., and weighs 2500 pounds. It has a useful load of 1050 pounds. Thalman, who has spent 10 years developing the plane, says it can sell for "under \$10,000."

Helicopter "Bear-Paw" Gear For Rough Terrain Landing

Bloomfield, Conn. Kaman Aircraft has developed a landing-gear attachment called "bear-paws" to adapt Marine HOK-1 helicopters to landings in snow, sand and mud by providing a large landing-gear area that will not sink into soft surfaces. Small, light-weight, and easily attached, the "bear-paws" should eventually prove valuable to industrial helicopters operating in rough terrain.

New Piasecki Rotor Design Offers Low Cost, Low Maintenance

Philadelphia, Pa. A contract to design, manufacture and flight-test a radically new vibration-reducing, low-cost, low-maintenance helicopter rotor that will greatly decrease the initial and operating cost of rotary-wing aircraft has been awarded to Piasecki Aircraft Corp., Philadelphia. The advantages of the Piasecki-design rotor will be of interest to off-shore oil-drillers and in other industrial applications of the helicopter.

By eliminating many parts of the present assembly of rotor blades and their attachments to the drive and 80% of the bearings in the present hinge-assembly design, the new Piasecki rotor will extend the time between overhauls, reduce repair time, minimize the points of daily lubrication and substantially reduce annual operating costs.

New Free Guide to Port Authority Air Shipping Facilities Available

New York, N.Y. A Guide to Air Shipping via the Port of New York has been made available, free upon request, by the Port of New York Authority for the use of shippers and traffic managers in the Port District and inland cities. It is designed to acquaint them with the general procedures in moving air cargo through the Port District.

The Guide provides information on regulations, charges and rates at the four Port Authority fields, LaGuardia, New York International, Newark and Teterboro. It is divided into two sections, one on International and the other on Domestic service.

Additional copies of the Guide may be obtained in New York from the Port of New York Authority, Aviation Development Division, 111 Eighth Ave., New York 11. Shippers outside the New York area should direct their inquiries to the Port Authority's Trade Development Offices.

Riddle Flying Cargo for Air Force

Miami, Fla. John P. Riddle, President, has announced that Riddle Airlines has begun operation of a \$9 million three-year U.S.A.F. contract to fly military cargo between 20 Air Force bases in the east and midwest. To fulfill the contract the entire Riddle maintenance and operations sections were moved from Texas to the new Logair headquarters, Robins AFB, near Macon, Ga., in a single day. Eleven planes and 80 pilots with their families made the crosscountry move.

The Logair program is designed to airlift military supplies between Air Force bases in Maine, Florida and Texas.

John Hughes, director of military operations for Riddle, is in charge of overall operations at Robins. Capt. W. F. Peterson is chief pilot, and maintenance operations are supervised by Jack Schopenhauer, Riddle's Vice President for Maintenance.

World War II Trainers For Sale at Kelly AFB

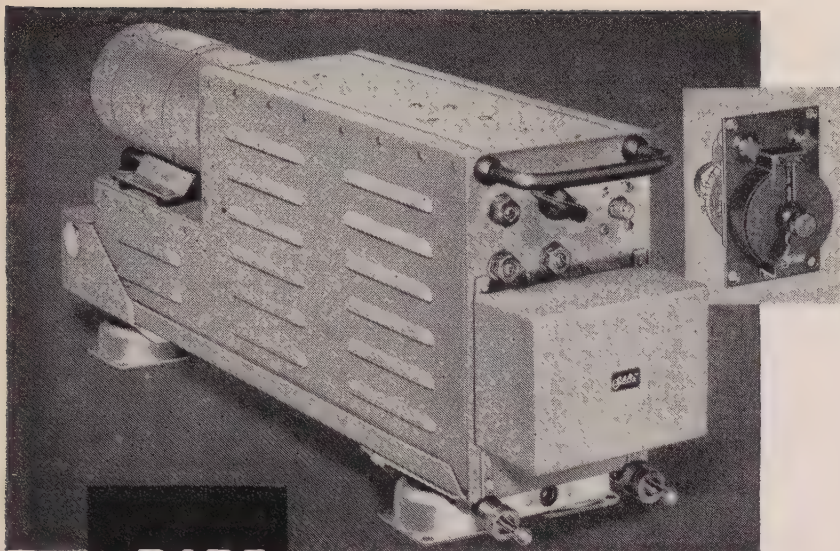
San Antonio, Tex. One hundred and ninety-one T-6 basic trainers will be made available for industrial modification at two sales, to be held within a few months, at the Kelly Air Force Base, San Antonio, Texas.

May Exports of Civil Aircraft Up 37% Over 1955 Monthly Average

Washington, D.C. Exports of civil aircraft weighing 6000 pounds or less during May amounted to 73 units valued at \$1,052,276, according to Irving Taylor, Export Director of the Aircraft Industries Association.

The aircraft were shipped to 21 different countries, Canada leading with a purchase of 25 aircraft valued at \$311,423. Unit shipments for May represent a 37% increase over the average monthly shipments for 1955, and an increase in value of 69%.

Companies reporting exports included Aero Design and Engineering Co., Beech Aircraft Corp., Cessna Aircraft Co., Piper Aircraft Corp., and Taylorcraft, Inc.



360 Channel VHF Transceiver

with 15-watt Transmitter Output

A new DARE Communications transceiver, born of consumer demand, and developed to maximum usability by DARE engineers is now ready. The new DTR-360 features great compactness, with maximum power and sensitivity. Moderately priced, it is ideal for executive, corporate, military or transport requirements. The entire unit, including dynamotor is built on a 1/2 ATR frame, mounted for maximum protection on latest type metal-mounts.

Look over the specifications. Then ask your DARE distributor to tell you more about this fine product.

Brief Specifications

Receiver Sensitivity—2 microvolts or better for 150 milliwatt output. Highly selective circuit employs double conversion. Audio output up to 8 watts for loud and clear speaker reception or headphone use. Adjustable squelch.

Transmitter—Power Output at least 15-watts on any channel. Frequency stability .01% or better. Eight ruggedized tubes.

Power Supply—Dependable dynamotor type. Two voltage regulator tubes provide drift free operation of all critical circuits. 14 or 28 volt input, as desired. Also includes transmitter modulator and receiver power output stages.

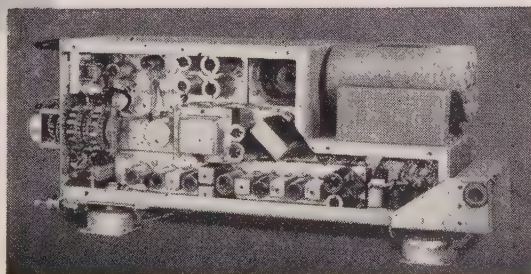
Physical—(with shock mount) Overall size 9 3/4" high x 23 3/8" long x 5" wide. Net weight 24 lbs. complete.

180 or 360 Channel Operation—Available for either 180 or 360 channels. On 180 operation you get a crystal controlled channel every 100 kilocycles all the way from 118.0 megacycles to 135.9 megacycles. On 360 channel operation you have a crystal channel every 50 kilocycles over the same range.

Simplex or Cross Channel (Duplex) Operation—With a single DARE backlighted control you receive and transmit on the same selected channel. With two DARE controls you can receive and transmit on different channels, if you so desire.

Economical Crystal Saver Circuit—DARE engineering has devised a unique circuit requiring only ten frequency wires to connect the control to the transceiver. Only 38 crystals are required for 180-channel operation and only 58 for 360 channel.

Easy on the serviceman, too—The new DTR-360 was designed for economical servicing. The entire unit is "unitized," has separate chassis for receiver, transmitter, and power supply elements. All tube testing and service alignment can be done from one side, which is easily accessible. Front panel jacks make transmitter metering easy.



See your Dare
Distributor
or write . . .

DARE, INC.
TROY, OHIO

New DARE DTR-360 Transceiver

available from these
leading distributors

EAST

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Buffalo 25, New York | Reading Aviation Service, Inc.
Municipal Airport
Reading, Pennsylvania |
| Butler Aviation
Washington National Airport
Washington 1, D. C. | Safair Flying Service, Inc.
Teterboro Terminal Airport
Teterboro, New Jersey |
| | Usher Aviation, Inc.
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New Haven, Conn. |
| | Wings, Inc.
Wings Field
Ambler, Pennsylvania |

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| Aircraftco, Inc.
New Municipal Airport
Wichita, Kansas | Great Lakes Airmotive
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Ypsilanti, Michigan |
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Cleveland-Hopkins Airport
Cleveland 11, Ohio | Midwest Airways, Inc.
General Mitchell Field
Milwaukee, Wisconsin |
| Capitol Aviation
Capitol Airport
Springfield, Illinois | Minnesota Airmotive, Inc.
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Minneapolis, Minn. |
| Chamberlain Aviation
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Box 125 Lambert Field
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Hangar
St. Louis, Missouri | Southern Ohio Aviation Co.
Dayton Municipal Airport
Vandalia, Ohio |
| | Topeka Piper Sales
Municipal Airport
Topeka, Kansas |
| Des Moines Flying Service
Municipal Airport
Des Moines, Iowa | Walston Aviation Company
Memorial Airport
East Alton, Illinois |

- | | |
|--|---|
| Executive Aircraft Corp.
Municipal Airport
Pontiac, Michigan | Youngstown Airways
Municipal Airport
Youngstown, Ohio |
|--|---|

SOUTHEAST

- | | |
|--|--|
| Aircraft Radio Service
Byrd Airport
Sandston, Virginia | Southern Aero Radio, Inc.
Municipal Airport
Atlanta, Georgia |
| Cannon Aircraft Sales & Service
Cannon Airport
Charlotte, North Carolina | |

SOUTH

- | | |
|--|---|
| Air-Tronics Company
New Orleans Municipal Airport
New Orleans, Louisiana | Memphis Aero
Municipal Airport
Memphis, Tennessee |
|--|---|

SOUTHWEST

- | | |
|--|--|
| Aircraftsmen, Inc.
Will Rogers Field
Oklahoma City, Oklahoma | Faulkner Air Radio
Municipal Airport
Houston 17, Texas |
| Associated Radio, Inc.
3508 Love Field Drive
Dallas, Texas | Howard Aero Service
International Airport
San Antonio, Texas |

West Texas Flying Service
Midland Air Park
Midland, Texas

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- | | |
|---|--|
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Oakland International Airport
Oakland, California | Qualitron, Inc.
2945 Hollywood Way
Burbank, California |
| Denver Airplane Supply
Division of Clinton
Aviation
Stapleton Airfield
Denver, Colorado | Santa Monica Aviation
Santa Monica Airport
Santa Monica, California |
| Flightcraft, Inc.
Portland International Airport
Portland, Oregon | Skycrafters Aviation Radio
Long Beach Municipal Airport
Long Beach, California |
| | Sua Valley Air Service
Sky Harbor Airport
Phoenix, Arizona |

CANADA

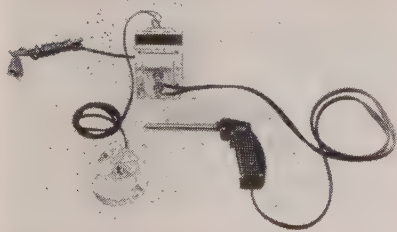
Technical Enterprises Ltd
Malton Airport
Malton, Ontario, Canada

Devoted to Equipment and Service Needs of Executive and Utility Aircraft

Heavy Duty Soldering Gun Weighs Only Six Ounces

On numerous occasions where solderless-type terminals or other connecting methods are not applicable, hot soldering is a necessity which usually requires bringing an aircraft into or immediately adjacent to a shop or hangar. The Model SF-100 Flash soldering gun of Phillips Mfg. Co., Inc., of Minneapolis will operate from any six to 12 volt AC or DC current supply, whether it be an airport service jeep battery, a battery car for engine starting or the aircraft battery for quick jobs!

The Flash 100 has no wattage rating as it delivers virtually infinite, trigger controlled heat limited only by the melting point of the tip and the current capacity of the source. It develops operating temperature in 4 to 6 seconds and can perform in places, such as behind instrument panels where previous guns cannot. Tips are interchangeable and the gun can be used with 110 volt AC through the Flash HD-520 step-down transformer.



New Warm Windshield Bounces Birds, Won't Break

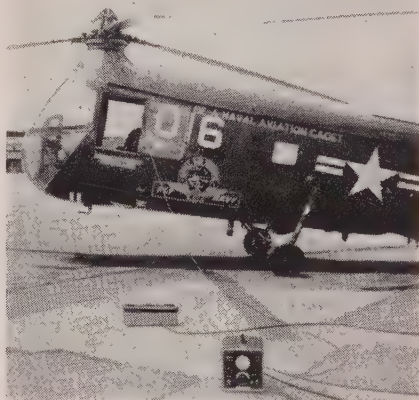
Whether the increasing incidence of bird-aircraft collisions are a form of Ghandi-like protest by our feathered compatriots against the usurpation of the airspaces will never be known. At the lower levels associated with take-off and landing, such collisions are not only more frequent but more critical to all aircraft.

Pittsburgh Plate Glass Co. has introduced a new windshield glass, trademarked NESA, which discards the solution of using heavier glass by substituting flexibility or "bounce." It consists of several laminations of glass covering a clear, electric-current-carrying plastic. First installed by TWA, the current is switched on before take-off or landing, and by heating the glass eliminates brittleness. This enables the windshield to give slightly under impact, then spring out again.

There are electric terminals at the top and bottom of the windshield which send the current through the plastic conductor. This also aids in fighting icing and fogging.

Electronic Rotor Blade Tracker

A major problem of maintenance, safety and research which has faced the helicopter industry and users, including airlines, the military and private corporation, has been solved by the first successful airborne (or ground) rotor blade tracker offered by Chicago Aerial Industries, Inc., Melrose Park, Illinois.



Vibration as an inherent characteristic of rotary-wing aircraft flight is under constant siege by designers and service people. In order to minimize vibration, fully-articulated rotors must track in the same flight path and rotate in the same plane. The process of making the necessary adjustments and measuring the relative vertical position of each blade tip is usually done laboriously by a minimum of four men using a canvas strip on a high pole moved slowly against the tips as they are slowly rotated to just "tick" the canvas "flag" somewhat similar to propeller tracking hand methods.

The CAI Electronic Blade Tracker is an electro-optical device that accurately determines, either on the ground or in the air, the tracking position of any blade in its flight path in the same plane of rotation. It weighs only 34 lbs and requires no attachments to the blades. Showing the average of many electro-optical samplings, erratic readings, which often occur as a result of ground effect, wind gusts, etc., are eliminated. It is designed for either base or field operation as well as airborne.

"Hot Spray" Improves Aircraft Refinishing

When new paint jobs are required on small or large aircraft, hot spray application, long used by aircraft manufacturers, is now serving to cut time and material costs for aircraft refinishers in small and large shops everywhere.

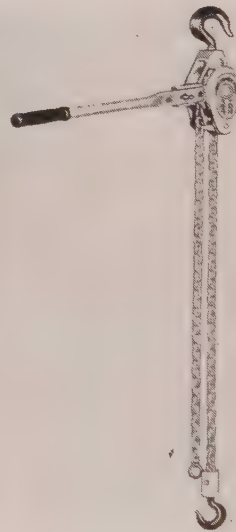
In the hot spray process, controlled heat maintains constant viscosity. Viscosity is reduced by heat more than is possible with

Light Lever Hoist Ideal For Small Engine Shops

Base operators who often have a problem of limited space in their engine and overhaul spots, usually in an ill-begrudged corner of a hangar, will be interested in the $\frac{3}{4}$ ton Lever Hoist of Thern Machine Co., of Winona, Minnesota, that uses only $\frac{1}{3}$ arc movement for operation.

This enables the hoist to be operated in tight or limited quarters, such as close to vulnerable aircraft surfaces. In addition, a special ratchet with two-levers on constant contact with the ratchet wheel keeps control at all times and assures positively against slippage. The maker claims 60% less effort to lift any weight as with a differential hoist.

Made of aluminum alloy except for the brass plated steel alloy chain, the hoist is 100% rustproof. Standard chain length is 64" but longer chain is available.



solvents alone. When the material is atomized, fast solvents are evaporated between the gun and the airplane surface, leaving a high solids film.

The finish is smoother, has better gloss, is cleaner and runs and sags are eliminated. For customer satisfaction, hot sprayed finishes last twice as long. Sprayers report material savings that average almost 25%, and time savings of one-third. One coat of hot spray usually equals two coats of cold spray. A free booklet explaining the process is available from Spee-Flo Company, 720 Polk, Houston, Texas.

Rust Check Spray Has Wide Potential

Known as "Rust Chek," a new rust preventative spray packaged in a 12 ounce aerosol spray container by the Eastern Aerosol Products Company of Newfound-

(Continued on page 48)

... in the business hangar

(Continued from page 19)

■ Lear Aircraft Engineering Div., Santa Monica, performed a 100-hour inspection on the Harold S. Vanderbilt Learstar, Capt. Bill Faulds, Pilot. □ Pilot Bob Darnall brought Johnson and Johnson's Mark I Learstar to Lear for installation of Bendix X-Band radar and for modifications to increase gross weights to 24,000 pounds for take-off and 21,500 for landing. □ Capt. Al Franks and Co-pilot "Pat" Patterson have the C. B. Wrightsman Mark I Learstar back in service following inspection at Lear Aircraft Engineering Div.

■ Van's Air Service, Inc., at new facilities in Winona, Minn., concluded a 100-hour inspection of the J. R. Watkins Co.'s DC-3. □ Van's installed wing-tip fuel tanks on the Cashman Nurseries Navion. □ Two rebuilt engines were installed in DeKalb Agricultural Assn.'s Aero Commander. □ Majestic Contractor's Aero Commander is at Van's for an engine change, and they are rebuilding another engine for Majestic.

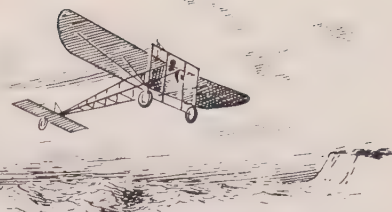
■ Horton and Horton, Fort Worth, have completed the rebuilding and custom styling of seats in the executive interior conversion of the Beech D-18 delivered to Paul C. Holst, Chief Pilot and NBAA representative of Michigan Tool Co. □ C. A. Moore, Director of Mississippi Aeronautics Commission, now sports a red-and-white Horton and Horton custom interior in his Navion. □ Horton and Horton has

completed a custom interior in blue, grey, turquoise and silver in Arthur Godfrey's new 47-H Bell Helicopter.

■ Northwestern Aeronautical Corp., St. Paul, is working on one of Kimberly-Clark's DC-3's, installing a new instrument panel, C4 compass, H5 horizon, dual Collins RMI wired to work on OMNI and ADF bands, and miscellaneous repair work. Roy Cleveland, Pilot, and John Champion, Co-pilot, flew the ship to Northwestern. □ Recently established as a new dealer for Aerojet General, Northwestern Aeronautical installed JATO on Kearny-Trecker's DC-3. Carl Koeling is Chief Pilot and NBAA representative; Mack Heath is their Chief Mechanic.

■ Aerotron Radio Co., Tulsa, has completed a \$40,000 electronics installation in the model 680 Super Aero Commander belonging to Cabot Carbon Corp., Pampa, Tex., Ralph Prock, Pilot. The installation included 360-channel VHF Collins 17L4 transmitter and 51X receiver, three auxiliary VHF ARC T21 transmitters (30 channels), dual ARC Omni 15D's, an ARC ADF21, Lear L2 autopilot, Collins 51V2 glide slope receiver, Flitronics CA1 amplifier, MD-3 marker beacon receiver, ARC CD-1 course director and Narco DME.

■ Air Corp. of Miami has completed modification of two DC-3's for CINTA, Chilean airline, for operation from two-mile-high airports. Modifications include installation of Pratt & Whitney Super-94 engines and heavy-duty landing gear.



DOVER • 1909

On July 25, 1909, Louis Bleriot made the first successful flight across the English Channel to Dover, England, in a small monoplane of his own design.

This feat won world attention and pointed up the progress in airplane design and construction since the Wright Brothers first flight only six years before.

Continuous experimentation was a costly financial problem to the young aviation industry in the early 1920's. The "U.S. Group", organized in 1928, was able to greatly relieve this financial situation with insurance protection against these experimental losses.

Now, over a quarter century later, the "U.S. Group" still serves the aviation market and is proving its hard won reputation for prompt and dependable service.

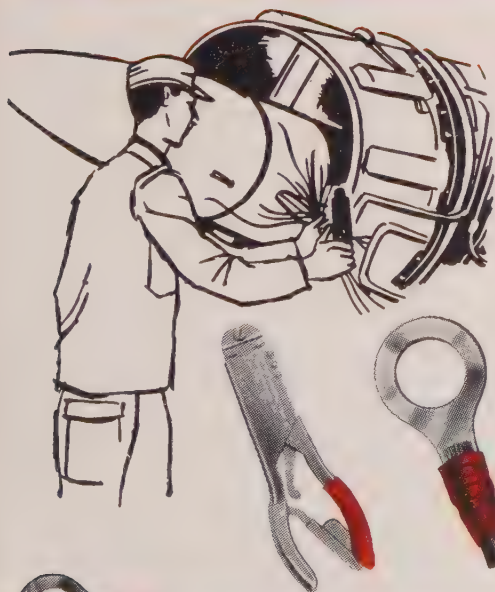
Whatever your aviation insurance need, there is a "U.S. Group" policy to serve you. Your own agent or broker can arrange coverage.



UNITED STATES AVIATION UNDERWRITERS
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as good as new?

of course it will be!



He is using the same A-MP® electrical terminals that are used as original equipment by manufacturers.

Now you, too, can have all the famous A-MP specialized terminal types for maintenance work right in your own hangar—those same terminals that are standard equipment in new planes.

API, through its local offices, brings you the complete line—the A-MP Pre-Insulated Diamond-Grip Terminals and Butt Connectors, the Window Connectors, the Amplibond and Aluminum Terminals—designed and developed specifically for the aircraft industry.

The tools, too, of course—the Certi-Crimp and the A-MP T-Head tool for wire sizes 22-14 complete the team that assures the highest quality termination required in aircraft work. Special aircraft maintenance kits and continuing service are available to meet your most stringent requirements. Ask your API representative about Custom Fitted Kits.

API branch offices stock popular A-MP terminals and tools for maintenance and repair purposes. Contact your local API office for a catalog.

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**American
Pamcor,
Inc.**

Subsidiary of
Aircraft-Marine
Products, Inc.

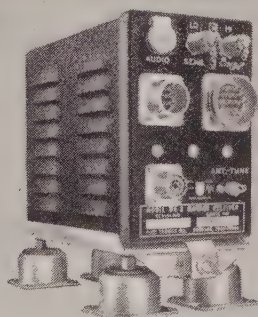
181 Hillcrest
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Havertown, Pa.

FLIGHT CHECKED!

Lightweight FLITE-TRONICS MB-3 Marker Beacon Receivers specified by Lockheed Aircraft Corporation for their new Twin Bonanzas are giving exceptionally dependable, accurate 3-light and audio 75 mc marker signal indications!



You'll be glad to know, too, that the MB-3 is the most economical visual-aural, 3-light marker beacon receiver available—fully CAA certificated—flying with more new executive aircraft than any other make!



"Fish" Salmon, Lockheed Engineering Chief Test Pilot, knows the value of equipment dependability—it's his job!

Write for illustrated free folder on the MB-3 Marker Beacon Receiver TODAY!

FLITE-TRONICS, inc.

Manufacturer of CA-1 Cockpit Audio Amplifier,
CA-20 Cabin Audio Amplifier, DS-5 Cockpit Audio Isolation System

3303 BURTON AVENUE • BURBANK, CALIFORNIA

Chicago Hotel Opens Rooftop Heliport

Chicago, Ill. The Hotel Sherman inaugurated a new era in Midwestern hotel service, Saturday, April 14, when it inaugurated its new heliport for guests atop a penthouse on the 18th floor.

The first guest to arrive for the formal opening ceremonies was CBS radio and television entertainer and aviation enthusiast Arthur Godfrey.

In an earlier test flight from the site, Frank Bering, chairman of the hotel, flew as a passenger with pilot Al Luke, Lewis College, Lockport, Ill., who also piloted Godfrey on the opening day.

Bering said his new duties of welcoming guests arriving by helicopter will complete

a many-year cycle; he used to greet guests who came in horse and buggies.

'Copter Line Spurs Field

The helicopter "line" between Washington and President Eisenhower's quarters in Gettysburg, Pa., is going to have some influence in official thinking regarding rotary-wing aircraft advantages, according to certain capital opinion. Transatlantic commercial operations were immeasurably spurred after the war, this opinion points out, because of the recognition by Allied leaders of its usefulness, in maintaining communications and liaison.

This opinion points out the lift given to business flying by President Eisenhower's use of an *Aero Commander* to fly him between the capital and his farm.

Navicom

(Continued from page 22)

event, not later than August 20, 1956.

The Air Traffic Control and Navigation Panel is composed of navigation and traffic control officials of the Federal agencies and industry. It is under the chairmanship of the CAA Administrator, Mr. Charles J. Lowen, and will operate on a full-time priority basis until its report is completed and transmitted to the Air Coordinating Committee.

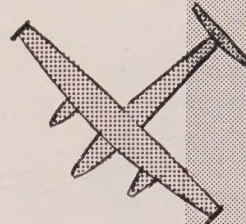
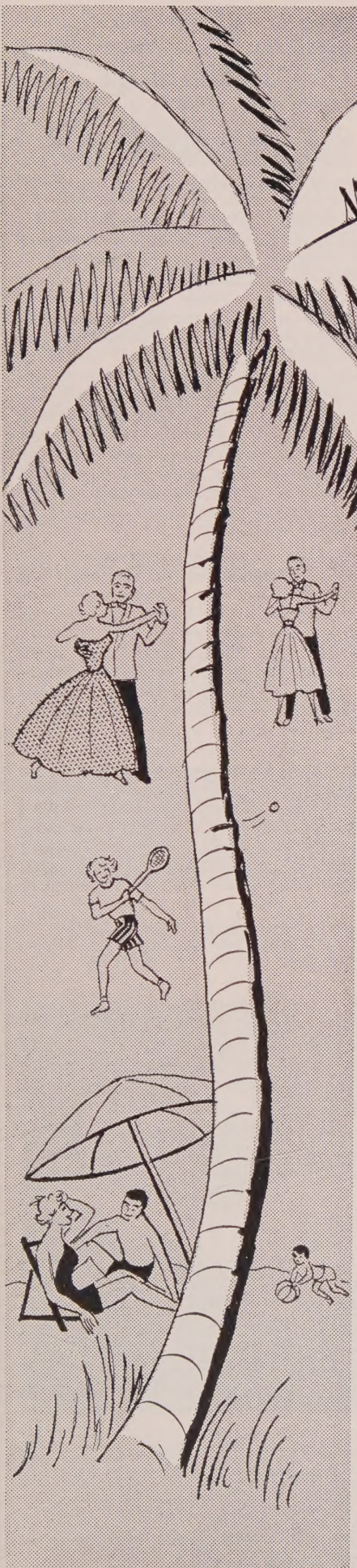
"Selective Calling" Has ATC Possibilities

An improved selective signalling device to relieve pilots of the task of maintaining a constant listening watch on IFR operations has been announced by the Dualex Div. of Bell & Gossett Co., Morton Grove, Ill. Previous selective calling radio systems were unable to call flights by their flight numbers or identification. A code system was a necessary addition which often became quite involved when an exchange of flight equipment was made enroute. Nor could code systems use identifications that involved repeats in component letters consecutively.

With the Dualex system, by merely turning four dials, any number from 0000 to 9999 may be called, giving sufficient individuality to accommodate not only airline trip numbers but a coded company identification where duplication of the last three numbers occurs, a current hazardous condition now facing ATC in hi-density areas. This will also accommodate the non-airline flight by use of the last four digits of the aircraft's identification.

ATC Centers currently require all IFR aircraft to maintain a listening watch 100% of the enroute time although average active message time to each aircraft may be less than 5% of that time (unlike ATC in terminal areas where pertinent messages may be quite frequent). With Dualex Selective Calling, 10,000 individual aircraft could be called, far beyond the present or anticipated load of the Center, by simply selecting the corresponding aircraft or trip number. All pilots in the jurisdiction of a Center so equipped could concentrate on their navigational problems.

By tying in a particular piece of airborne equipment or function to the fifth dial, the ground station operator, without involving or calling the pilot first, can select or control any one of nine additional functions in the aircraft. Thus, the ground station could obtain automatic enroute weather or position reports, or other information without pilot assistance.



NATIONAL BUSINESS AIRCRAFT ASSOCIATION

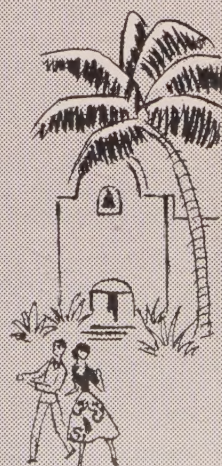
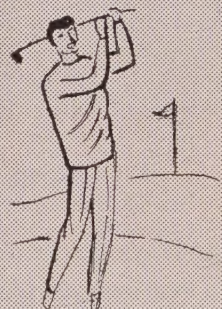
**Ninth Annual Forum
Miami, Fla.**

OCTOBER 23, 24, 25
(Tuesday, Wednesday, Thursday)

**Headquarters Hotels:
McAllister & Columbus**

The Business Sessions are scheduled for mid-week meetings.

The weekends before and after are free, so why not enjoy a vacation *too* while you're in Florida? Perhaps you'd like to bring along the whole family! Plan trips to the Everglades, Bermuda, and the exciting attractions of the Caribbean islands—Havana—Haiti—Jamaica!





Now a wonderful career opportunity: be a flight officer with United Air Lines!

Did you know that if you have a commercial pilot's license with 165 hours or more—no multi-engine time required—you may qualify to become a United Air Lines Flight Officer?

Your basic qualifications and aptitudes are more important than number of hours flown. United's Flight Training Center at Denver, Colo., offers unusually thorough training programs, with pay, for all new flight personnel.

Pay is excellent: you get \$485 a month as soon as you go on line duty, and increases at regular intervals. You get a broad insurance program, retirement income plan, many other benefits.

Here are your other basic requirements: you must be a U. S. citizen, 21-30, between 5'7" and 6'4" in height, a high school graduate and able to pass a flight physical without waivers. Applicants with C.A.A. instrument rating and superior flight qualifications will be accepted through age 32.

Your future is assured by United's expansion program. Send for the booklet today!

C. M. Urbach, Supt. of Placement
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Stapleton Airfield, Denver 5, Colorado

Please send me your booklet that tells me how I can become a Flight Officer with United Air Lines.

Name.....

Street.....

City.....Zone.....State.....

NBAA

(Continued from page 25)

include airports, airways, navigational aids and the communications network.) "But," he added, "I am equally sure there are many who are under the impression that we are not entitled to a full place—and therein lies our problem."

The AIA official pointed out that estimates by the Civil Aeronautics Administration covering all civil flying in 1955 disclose that "already wrapped up in the general aviation flying package are some 60,000 active civil aircraft which flew 9,500,000 hours."

Geuting said, "This fleet outnumbers the airline fleet of 1,500 aircraft forty times. The hours flown were three times more than flown by the airlines." Geuting cited additional facts supporting the economic importance of general aviation:

(1) Flying for business purposes accounted for 4,300,000 hours last year, one million more than the airlines; (2) More than 90 of the nation's 100 largest corporations operate one or more airplanes; (3) Deliveries of new aircraft used in general aviation are increasing—3,073 units in 1954, 4,434 in 1955 and, based on deliveries so far this year, there will be 6,000 or more in 1956; (4) General aviation has more aircraft engaged in airline-type instrument flying than the airlines themselves and more auto-pilot installations.

Suggest Special Permit For Civil Landings at Military Ports

NBAA recently wrote the Secretary of the Airport Use Panel of the Air Coordinating Committee concerning a matter of much interest to business aircraft operators who, of necessity, must land on jointly used civil/military airports or military air bases. The letter, quoted in part, is self-explanatory.

... "Regarding a more simplified pro-

cedure for civil aircraft to use joint civil/military airports or military air bases, the following proposal is offered for consideration as an agenda item for the next general meeting of the Airport Use Panel.

"As we well know, because of the complexities of U.S. Air Force regulations regarding permission for civil aircraft to land on joint civil/military airports and military air bases, much time is wasted and considerable frustration is experienced in attempting to comply with the requirements.

"Without dwelling on the intricacies of these regulations, it is proposed that the USAF make available an application form for issuance of a special limited landing permit for civil aircraft operators who have occasion to carry out official business at various joint civil/military airports and military air bases. The civil aircraft operator could fill out the form, indicating the airports used from time to time in connection with official matters, and submit appropriate evidence of the need for a special limited landing permit, plus pertinent aircraft data, communications equipment, insurance coverage, etc.

"After review and acceptance by the USAF, a special limited landing permit, specifying only the airports where clearance is granted for landing during certain hours of the day, can be issued to the applicant. Since the permit will carry a code number, and the C.O. of the air bases involved would have a record of the applicant on file for control tower reference, all that would be required by the civil pilot when approaching the area, would be a call to the tower giving the permit code number and requesting clearance to land.

"Such a procedure would be relatively simple, eliminate a great deal of the paper work now required by the USAF for individual clearances—many times for the same airport in a matter of weeks—and eliminate the long delays often experienced before permission is finally granted for landing on the joint/military airport or military air base."



DAVE PETERSON, Chief Pilot for the Sinclair Refining Co., Tulsa, has many "firsts" in this, his brain-child, a twin conversion of the Beech Bonanza, which started flight tests July 10. Power plants are four-cylinder so-called "flat" horizontally opposed engines, inverted, with fuel injection and airfoil nacelles less than fourteen inches thick. Take-off, climb and minimum single-engine control speed are reported phenomenal. Production plans depend upon CAA certification and response from Bonanza owners.

Remmert-Werner

for

Bendix
Collins
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RADAR

X-Band
or
C-Band

CORRECT RADOMES FOR X or C BAND

●Only R/W has the reinforced double-shell dielectric radome recommended for X-Band—high transmission efficiency and high structural strength with no compromise or loss—no restrictions of air speed or any kind. Weather-tight fitting, leak-proof, quiet. Won't vibrate loose. Lowest installation cost.

●Separately hinged radome and scanner, for easy disconnect and adjusting—necessary for accurate antenna tuning. Quick access to instrument panel.

●R/W pioneered radar for business DC3 and Lodestar, with experimental work for Westinghouse, demonstrator for Bendix, and the first commercial DC3 installation, and has put in more executive DC3 radar than all others.

Write today for an estimate for your
DC3 Lodestar Twin Beech

Remmert-Werner, Lambert Field, St. Louis

RADOMES

Complete Packaged Units, CAA Approved, including installation parts, antenna mount, drawings, instructions for installation, certified performance data —

for

Douglas B-23 and DC-3 and Lockheed Lodestar. Special kits also available meeting CAA requirements for Martin B-26, Consolidated B-24, Beechcraft 18.

Write for free descriptive booklet.

1513A

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MUNICIPAL AIRPORT • AKRON, OHIO

Largest Supplier of Radomes for Executive Aircraft

Get the latest, smallest, lightest DC3 LANDING GEAR DOORS

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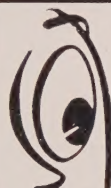
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Nu-Avi-Quip

(Continued from page 40)

land, N. J., provides approximately 80 square feet of coverage in the form of a clear, dry, waxy film to a thickness of .0005. Except in the case of use on precision instruments where critical tolerances are to be held, the film *need not be removed* when the protected tool, mold, machinery, etc., is removed from storage or tool crib and readied for use. The film is worked off in the using, and in some applications, such as on power saws, it serves as a lubricant.



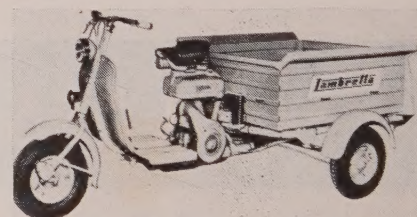
For stock-piled parts and other applications in which the Rust Chek is designed to simplify the work of applying a preserva-

tive, the manufacturer claims it has advantages over oil or grease in that it does not absorb dust and dirt. Submersion tests in salt water and in other liquids simulating various industrial atmospheric conditions indicate that the new product will provide complete and permanent protection for tools, dies, molds, machinery and metal surfaces during storage periods or in transit. It can also be used outdoors (as in yards and on shipping platforms) where permanent or temporary coatings are required for machinery, motors, unpainted metal containers, equipment, etc.

Photo shows Rust Chek container and metal strip which has been subjected to hundreds of humidity and salt water exposures.

Fast New Pickup For In-Plant Use

Suitable for in-plant delivery needs of large aircraft service organizations, these three wheel Lambretta motor scooters, equipped with open pickup bodies capable of a 600 pound load, are shuttling parts and supplies all over the industry's mammoth indoor acreage. They are quicker, more agile than any other vehicle. Costs have been considerably reduced, man-hours and delivery time sliced to minimum. Clearance height is so low they can operate between and under many hangar-stored aircraft with ease.



An important contribution to these savings is scooter unit-cost. As one aircraft executive put it: "Expenses for our in-plant delivery program have been ridiculously low. Each Lambretta paid for itself in about a month. They cost a fraction of what small trucks would have set us back and travel up to 85 miles on a gallon of gas. We've worked ours steadily for almost a year—sometimes for three shifts straight. Maintenance has cost only about 5 per cent of the purchase price."

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'Ground Loops' on Oil-Slick Is Target of New Paint

As fixed base and business plane operators well know, one of the most troublesome ground hazards is the slippery surface of an oil loading platform or any other surface where gas and oils are likely to be unavoidably splattered.

DuPont Chemical Co.'s researchers have just come up with a special paint aimed right at that problem. Called simply, DuPont Slip-Retardant Paint, the new coating incorporates its anti-slip agents in a high quality enamel and, of special interest to those who work around fuels, is non-metallic and therefore non-sparking.

Of interest to the maintenance crew is the fact that the paint is non-slip without the customary gritty anti-slip agents which produce excessive wear on spray guns.